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Royal Premium.—His Majesty having been graciously pleased to bestow on the Society an Annual Donation of Fifty Guineas, to constitute a Premium for the encouragement and promotion of Geographical Science and Discovery, the President and Council conferred the same, last year, on Mr. Richard Lander, in acknowledgment of his important services in determining the course and termination of the Quorra, or Niger.

The Premium for the present year is affirmed for the best work communicated to the Society of the following nature :—

'A Traveller's Manual—containing a clear and concise enumeration of the objects to which a Geographer's attention should be especially directed, a statement of the readiest means by which the desired information in each branch may be obtained; a list of the best instruments for determining positions, measuring elevations and distances, observing magnetic phenomena, ascertaining temperature, climate, &c.; directions for adjusting the instruments, formulæ for registering the observations, and rules for working out the results;—adapted to the use, not of the general Traveller alone, but also of him who, in exploring barbarous countries, may be obliged to carry and often conceal his implements.'

And the following are further proposed as Prize subjects, viz.—

'An Essay on the actual state of Geography in its various departments, distinguishing the known from the unknown, and showing what has been, and what remains to be done, in order to render it an exact Science; together with an indication of the best processes to be adopted in order to supply the several desiderata.

'An extensive series of Geographical Tables (with reference to

authorities), showing the various names, written in the native language and character, by which the same places have been known, in different Countries, and at successive periods of History.'

'The best mechanical inventions for facilitating the acquisition of Geographical Knowledge, and rendering it more available to the Public. Under this head may be included the simplification of instruments—more compendious methods of determining positions—and all improvements in the art of drawing and engraving Maps, whereby their precision and distinctness may be increased, and greater scope and expression given to what may be called the Language of Topography.'

THE ORDINARY MEETINGS of the Royal Geographical Society, during the season 1832-3, will be held as under. The chair to be taken each evening at nine o'clock precisely :—

Monday,	November	12th	— 26th.
,,	December	10th	— 24th.
,,	January	14th	— 28th.
,,	February	11th	— 25th.
,,	March	11th	— 25th.
,,	April	8th	— 22d.
,,	May	13th	— 27th.
,,	June	10th	— 24th.

The Annual Meeting for the election of officers, &c., will be held on Monday, May 13, at one o'clock in the afternoon. The Library is open every day from eleven till four.

21, *Regent Street, St. James's.*



PAPERS READ

BEFORE THE

ROYAL GEOGRAPHICAL SOCIETY

I.—*Is the Quorra, which has lately been traced to its Discharge into the Sea, the same River as the Nigir of the Ancients?* By W. Martin Leake, Esq., V.P., F.R.S.

As there exists a difference of opinion on the propriety of applying the name Niger or Nigir to the river, of which the lower course and termination have lately been discovered, I am induced to submit to the Society a few remarks on this question, which immediately involves the greater one as to the extent of knowledge of the interior of Africa, acquired by the ancients. Upon the whole subject, it would have been sufficient to refer to D'Anville* and Rennell,† who favour the affirmative of the question, and on the opposite side to M. Walckenaer,‡ who, of all later writers, has examined it with the greatest diligence, had not recent discoveries furnished us with better grounds for forming a conclusive opinion, than even the latest of those authors possessed.

Maritime surveys have now completed a correct outline of Northern Africa. Major Laing, by ascertaining the source of the Quorra to be not more than 1600 feet above the sea, proved that it could not flow to the Nile; Denham and Clapperton demonstrated that it did not discharge itself into the lake of Bornú; and, at length, its real termination in a delta, at the head of the great gulf of the western coast of Africa, has rewarded the enlightened perseverance of the British Government, and the courage and enterprise of its servants. The value to science of this discovery, and the great merit of those whose successive exertions have prepared and completed it, is the more striking, when we consider that the hydrography of an unknown country is the most important step to a correct knowledge of its geography, and that in barbarous Africa nothing short of the ocular inquiries of educated men is sufficient to procure the requisite facts. It is curious to observe how the best collectors of oral information in that country have failed in arriving at the truth as to the origin, course, and termination of the rivers. Edrisi, Abulfeda, Leo Africanus,

* Mémoires de l'Académie des Inscriptions, vol. xxvi.
† Geography of Herodotus, sections 16, 22.
‡ Recherches Géographiques sur l'Intérieur de l'Afrique Septentrionale: an octavo of 517 pages, published at Paris in 1821.

Delisle, and Bruce, all came to the determination that the Quorra flowed from east to west.* Burckhardt, whose oral inquiries on Bornú have proved generally correct, concluded that the Shary flowed from N.E. to S.W.; and Lyon, though particularly successful in his information on the countries not visited by him, was induced to confound the Shary of Bornú with the Tjad or Yéu, and, like Sultan Bello, to carry the Quorra, after passing Yáuri and Funda, into the lake Tjad, and from thence to Egypt. The most intelligent natives are confused when questioned on the subject of rivers, while the generality, unable to understand the object or utility of such inquiries, can neither inform the traveller whether two streams are different rivers or part of the same; where any river rises or whither it flows; and seem often to believe that all the lakes and streams of Africa are parts of one and the same water. It is not surprising, therefore, that ancients as well as moderns, having obtained the knowledge of a large river flowing to the east, should have supposed that it was a branch of the Nile of Egypt; or that, when the existence of a great lake, in the direction of the known portion of its stream, became known, the opinion should have followed that the river terminated in that lake, or that it was discharged through the lake into the Nile. Such consequently, have been the prevalent notions in all ages, even among the most intelligent foreigners, as well as the highest class of natives,—from Herodotus, Etearchus, and Juba, to Ibn Batuta, and Bello of Sakkatú.

Considering these circumstances, it will hardly be contended that the late discovery has made any alteration in the nature of the question as to the identity of the Quorra and Nigir,—the sudden bend of the river to the southward, through a country which has been equally unknown to ancients and moderns, having always left the best informed of them in ignorance of any part of the river, except that of which the course was northerly or easterly. If, then, there is sufficient reason for the belief that these latter portions were known to the ancients, we have only to suppose them to have had some such imperfect knowledge of the interior of North-Africa, as we ourselves had attained previously to the expedition of Denham and Clapperton, to justify the application of the name Nigir to the whole course of the river. It remains to inquire whether they had that degree of knowledge.

The only passage in history, more ancient than the time of the Roman empire, from which an inference can be drawn that the Quorra was then known, is the description given by Herodotus

* Leo had been at Timbuktú, and had therefore seen the river; but he was very young at the time, and his memory probably failed him when he wrote his book many years afterwards in Italy.

of a very remarkable journey of discovery, undertaken, in his time, by some of the Nasamōnes, a Libyan people, who occupied the country lying between that of the Garamantes, or the modern Fezzán, and the great bay of Syrtis, and who appear to have held also the Oasis of Augila in their dependence.* Some of the sons of the chief men of the tribe having formed an association for the purpose of discovering new countries in the Libyan desert, five of them, chosen by lot, and furnished with every requisite, set out on this perilous enterprise. After having passed through the *οἰκεομένη*, or inhabited region, and the *θηριώδης*, or country of wild beasts, which lay beyond it, they traversed, during many days, the great sandy desert † towards the west, ‡ until they arrived in a country inhabited by men of a low stature, § who conducted them through extensive marshes || to a city, built on a great river, which produced crocodiles, and which flowed towards the rising sun. ¶

That there can be no casual error in the direction here ascribed to the current of the river, is proved by the historian's opinion, that it was a branch of the Nile, in which he coincided with Etearchus, king of the Ammonii, from whom, through the medium of the Greeks of Cyrene, his information on the Nasamonian expedition was derived.** It is equally evident that the country, visited by the Nasamōnes, could not have been near the maritime provinces, afterwards called Africa and Mauritania, for Herodotus expressly describes the *οἰκεομένη*, or inhabited country, as that which stretched along the Mediterranean from Egypt, as far as Cape Soloeis, now Blanco, thus comprehending all modern Barbary, and which, where not occupied by Greek or Phœnician colonies, was then inhabited by Libyans. The country of the wild beasts lay inland from the inhabited belt, and the desert was beyond the latter, so that it is impossible that the river discovered by the Nasamōnes could have been one of those lying on the southern side of the kingdom of Algiers, as in that case they would not have crossed any desert, and their most convenient route, for half the distance, would have been along the sea-coast.

That Herodotus could not have intended any but a part of the Sáhara, or Great Western Desert, as that which he believed the Nasamōnes to have crossed, seems evident from his forcible and accurate description of it,†† and from his similar description of the

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* Herodot. l. ii. c. 32.—l. iv. c. 172, 173, 175.—v. et Plin. l. v. c. 5—Strabo, p. 836.

† τὴν ἔρημον χῶρον πολλὸν ψαμμώδεα. ‡ πρὸς ζέφυρον ἄνεμον.

§ μετρίων ἐλάσσονας ἀνδρῶν. || δι' ἑλέων μεγίστων.

¶ ἀπὸ ἑσπέρης πρὸς ἥλιον ἀνατέλλοντα.

** It appears from the name of Etearchus, that the Greeks at that time possessed Ammonia.

†† Ὑπὲρ δὲ τῆς ὀφρύης ταύτης, τὸ πρὸς νότον καὶ μεσόγαιαν τῆς Λιβύης, ἔρημος καὶ ἄνυδρος καὶ ἄθηρος καὶ ἄνομβρος καὶ ἄξυλός ἐστι ἡ χώρη· καὶ ἰκμάδος ἐστὶ ἐν αὐτῇ οὐδέν.—Herodot. l. iv. c. 185.

Desert passed by the Nasamōnes. His account of the route from Thebes by the Oases of Ammon and Augila to Garamantia, and his notice of salt-mines beyond the latter country, are undoubted proofs that the Libyans, from whom he derived this knowledge, had given him a tolerably correct idea of the interior of North Africa between Egypt and the Sáhara, so that there wanted only such a discovery as that of the Nasamōnes to make him acquainted with the existence of the Quorra. That the Nasamōnes were exactly one of the people most likely to have undertaken such an enterprise as the historian describes, will appear on considering the position of their country in the centre of the northern coast of Africa, where a deep bay forms the beginning of the shortest line of communication with the centre of Æthiopia, and which is also the easiest, as there occur upon it no great intervals of waterless desert. Thus situated, the Nasamōnes were, together with their southerly neighbours, the Garamantes, naturally engaged as the principal carriers of that commerce by which the Carthaginians supplied themselves with slaves, elephants, gold, ivory, ebony, and other commodities, as well for home consumption as for the export trade of that opulent and powerful republic with the shores of the Mediterranean. The Nasamōnes having thus inevitably obtained a knowledge of a great part of the direct road into Æthiopia, it was natural that some of the most adventurous among them should explore the countries to the westward of that line, and undertake an enterprise by which they proposed, as Herodotus states, to exceed all their former exploits of the same kind.*

It is probable, therefore, that the inhabited country from whence the Nasamōnes took their departure, was that of Fezzán, which immediately bordered on their own, and that their route through the Θηριώδης was not very different, for a considerable distance, from that of Denham and Clapperton. From Bilma, or some of the Oases to the westward of that country, a course not more southerly than W.S.W., would have carried them to a part of the Djolibá, or Quorra, where, after having for a great distance flowed to the north, it has an easterly course, and where the marshes which they crossed may have been some inundation or enlargement which may then have existed, and may, perhaps, as that part of the stream remains to be examined, still exist: we learn from Park and Caillié how very subject the plains adjacent to the Quorra are to such inundations. That the Nasamōnes really reached this river, is strongly argued by the fact that the Quorra not only agrees with the data of Herodotus, but is the only river in North Africa that does so agree in its magnitude, in

* - - - - ἀνδρῶν δυναστέων παῖδας ὑβριστάς· τοὺς ἄλλα τε μηχανᾶσθαι ἀνδρωθέντας περισσὰ καὶ δὴ καὶ ἀποκληρῶσαι πέντε ἑωυτῶν ὀψομένους τὰ ἔρημα τῆς Λιβύης καὶ εἴ τι πλέον ἴδοιεν τῶν τὰ μακρότατα ἰδομένων.—Herodot. l. ii. c. 32.

the abundance of crocodiles which it produces, and in its flowing from west to east through a country inhabited by black men.

As to the direction of the Nasamōnes across the desert, described by the words πρὸς ζέφυρον ἄνεμον, it may be observed, that they are far from conveying the precision of a modern compass bearing, and may have been purposely used by the historian in an approximative sense; or, supposing this not to have been his meaning, that almost every ancient author from Homer downwards, and none more than the *geographer* Strabo, furnishes instances of the inaccuracy of the ancients in regard to bearings. In any case a route more westerly than that which I have just mentioned is not admissible, if we suppose Herodotus to have intended a due easterly course, or thereabouts, in stating the river to have flowed from the west to the rising sun, since it is evident that the direction of the route of the Nasamōnes was not coincident with the course of the river, but a line which intersected it.

There may be some difficulty in imagining that five young men could have crossed a desert of more than 600 miles, and have returned in safety, in the manner described by the historian; but to Libyans—practised in the art of crossing deserts—this may not have appeared so tremendous an operation as it does to us; and although, in the supposed direction of the discoverers, there are immense tracts meriting the historian's character of 'terribly deficient in water;'* there are also, according to the best information, several spots on the 'leopard's skin'† between Fezzán or Bilma and the Quorra, containing both water and inhabitants. M. Walckenaer supposes that the story may have been an invention of the five Nasamōnes themselves, who, having penetrated into one of the Oases, may there have obtained some real information of the Quorra. But, even in that case, we must conclude that a knowledge of the existence of the river had reached the coast of the Mediterranean in the time of Herodotus. Although it was not in Egypt, but in Cyrene, that the historian made this addition to his stock of information, it is hardly credible that the Egyptians, under the Pharaohs, whose dominions extended southward into the belt of country fertilized by the tropical rains, and who had thus an access uninterrupted by extensive deserts to the whole series of countries forming the modern Bilad-es-Sudán, should not have known the existence of the Quorra. Extant monuments give the greatest reason to believe that some of the Pharaohs carried their conquering arms to a considerable extent

* Τὰ δὲ κατύπερθε τῆς θηριώδιος, ψάμμος τέ ἐστι ἄνυδρος δεινῶς καὶ ἐρῆμος πάντων.—Herodot. l. xxi. c. 32.

† Ἔστι δ' (ἡ Λιβύη) ὥσπερ οἵ τε ἄλλοι δηλοῦσι καὶ δὴ καὶ Γναῖος Πείσων, ἡγεμὼν τῆς χώρας, διηγεῖτο ἡμῖν, ἐοικυῖα παρδαλῇ, κατάστικτος γάρ ἐστιν οἰκήσεσι περιεχομέναις ἐρήμῳ καὶ ἀνύδρῳ γῇ· καλοῦσι δὲ τάς τοιαύτας οἰκήσεις Αὐάσεις οἱ Αἰγύπτιοι.—Strabo, p. 130.

in these countries; and a great commercial intercourse with them seems an inevitable effect of the advanced state of society and the arts, which prevailed in Egypt during so many ages.

Admitting, however, all these to be matters of conjecture, which can never be thoroughly determined unless the Egyptian hieroglyphics, or some of the lost literature of Greece or Carthage should throw an unexpected light on the subject, I proceed to inquire how much of the interior of North Africa was known when the Romans were not only masters of all the fertile belt bordering on the Mediterranean, but had established colonies or garrisons in several of the districts insulated by the Great Desert? It must be admitted that, as late as the reign of Tiberius, this knowledge was not very great; it would seem, at least, that whatever information on the subject may have existed among the Carthaginians, or the Greeks of Egypt or Cyrene, it had not found its way into the works of the Greeks whom Strabo consulted in the compilation of his geography: Strabo, indeed, was not ignorant that an immense region, inhabited by black men,—for such is the meaning which the ancients constantly attached to the word Æthiopia,—extended from the southern frontier of Egypt, and the peninsula of Meroe,* to the Atlantic Ocean westward; but of the details of that country no certain knowledge had reached him, as he shows by citing the opposite testimonies of two of his principal authorities as to the rivers of Libya, Posidonius having asserted that they were few and small, and Artemidorus that they were great and numerous.†

But the frequent necessity of chastising the lawless tribes of the Libyan deserts inevitably led the Romans to further conquests, settlements, and discoveries; and existing monuments prove not only that Mauritania, Numidia, Cyrene, and Egypt enjoyed great prosperity under their protection during the three first centuries of the empire, but that their advanced posts were extended into Nubia, the Oases, and Fezzán. In the year 19 of the Christian era, Cornelius Balbus triumphed at Rome for his conquest of the Garamantes; and among numerous places of which representative images were carried in the procession, were those of Phasania, Garama, and Cydamus,‡ all which names still exist, or, at least, with little alteration. In the year 41 Suetonius Paullinus, afterwards Consul, was the first of the Romans who led an army across Mount Atlas. At the end of a ten days' march he reached the summit,—which even in summer was covered with snow,—and from thence, after passing a desert of black sand and burnt rocks, he arrived at a river called Ger;

* Strabo, p. 821. † Ibid., p. 830.
‡ Plin. H. N. l. v., c. 5.

he then penetrated into the country of the Canarii and Perorsi, the former of whom inhabited a woody region abounding in elephants and serpents, and the latter were Æthiopians, not far distant from the Pharusii and the river Daras.*

But the two most remarkable Roman expeditions, and which indicate a great progress in military enterprise and the geographical discovery arising from it, are those of Septimius Flaccus and Julius Maternus, which, although of uncertain date, and resting only on the authority of Marinus of Tyre, as cited by Ptolemy, † are curiously illustrated by the discoveries of Hornemann, Lyon, Denham, and Clapperton. Of Flaccus it is related only, that he was an officer serving in Libya, and that he accomplished a three months' march from the country of the Garamantes into that of the Æthiopians. Maternus, being at Leptis Magna, (now Lébeda near Tripoli,) proceeded from thence to accompany an expedition sent by the king of the Garamantes against his rebellious subjects in Æthiopia, on which occasion, after a march of four months from Leptis, Maternus arrived at Agisymba. In both instances, the direction of the route is stated to have been south.

Now a four months' march from Lébeda on the meridian of that place, at the mean rate of the march of armies, which Rennell deduced from a great number of examples to be 10.6 G. M. on the horizontal line, reaches exactly to the southern side of the lake Tjad, so that there is every probability that Maternus penetrated to that country, and that Bornú is the ancient Agisymba. It is true, that the only characteristic of Agisymba, mentioned by Ptolemy, namely, that it abounded in the rhinoceros, does not accord with the information of Denham, who has not included the rhinoceros among the animals found in Bornú; but as the abundance of the wild animals in any particular place depends upon the human race, and as the horn of the rhinoceros has long been a valuable object of commerce, the animal may now be driven into some more secure retreat. It is sufficient to observe, in support of the opinion, that Maternus really penetrated as far as Bornú; that the rhinoceros is an animal which frequents woods and marshy places, and consumes a great quantity of water, and, consequently, that it could never have been an inhabitant of any of the countries included within the desert belt of Libya.

If the bearing of the march of Flaccus was exactly the same as that of Maternus, his three months' journey would have carried him nearly to the same point as the four months' march of Maternus; for Gárama, from which the Garamantes took their name, and of which some remains are still to be seen not far from Morzúk in Fezzán, is between one-fourth and one-third of the distance from

* Plin. H. N. l. v., c. 1. † Ptolem. l. i., c. 8.

Lébeda to Bornú, on the same meridian: but, possibly, the direction of Flaccus differed a little, so as to have led him not to Bornú, but to some part of the country a little eastward or westward of the lake Tjad. There is great reason to believe, from the words of Ptolemy, which seem to be those of Marinus himself, that the road into Æthiopia by Gárama was, as I have before hinted, a frequented commercial track, as it is at the present day. Another remarkable resemblance between the modern condition of those countries and that which existed at the time of the expedition of Maternus is found in the subjection, at that time, of a part of Æthiopia to the Garamantes of Fezzán, who were themselves under the control of the Romans on the Mediterranean coast. In like manner, or nearly so, both Fezzán and Bornú, when Denham travelled, were considered dependant on the Pashá of Tripoli.

The conquest of a part of Æthiopia by the Garamantes accords with the allusions which we find in Roman history and poetry to the great power of that people, who were extended by conquest far beyond the limits of Fezzán, and would even seem, from one of the positions in Ptolemy, to have comprehended the modern Waday, and to have conquered as far as latitude 10° N., where a mountain was known by the name of ἡ Γαραμαντικὴ φάραγξ, or the Garamantic ravine.* Ptolemy appears not to have paid attention to this great extension of the Garamantes by conquest in a south-eastern direction, when he accused the two Romans of incorrectness in the bearings and distances of their marches; in support of which opinion he asserts, that there was not so great an interval as a three months' journey between the Garamantes and Æthiopians, and that, in fact, the Garamantes were themselves a people of Æthiopia;† for if we apply this remark to the Garamantes of Gárama, which Ptolemy places in lat. 21½, it is directly at variance with another passage, wherein the geographer observes that in the northern tropic men of the Æthiopian colour were not found so far north as the boundary of the tropic, but that about Meroe, in lat. 16½, they began to be black, and elephants and rhinocerotes began to be seen,‡ which exactly accords with modern observations. There seems no mode, therefore, of reconciling the geographer with himself, but by imputing to him some negligence in the distinction between Proper and Acquired Garamantia.

I have little doubt that Ptolemy's latitude of Garama was deduced from the computation of Flaccus and Maternus,§ who had reckoned 5400 stades from Leptis to Garama, for this exactly agrees with Ptolemy's distance between the two places, at his own

* Ptolem. l. iv., c. 6.
† Ibid. l. i., c. 8.
‡ Ptolem. l. i., c. 9.
§ Ibid. l. i., c. 10.

rate of 500 stades to the degree. By trusting to this computation, which, as so often happens in similar cases, was very exaggerated, he was misled 5° in the latitude of Garama, the real latitude being 26½, and this error he committed at the same time that he refused to trust to the far better geographical evidence of the number of days' march between Leptis and Agisymba. As to the extravagant southerly position which he gives to the latter place, namely, 16° south, it may perhaps be accounted for by the great southerly extension of the Garamantic name, which may have led him to calculate the difference of latitude from the southern part of Acquired Garamantia instead of from Garama. It is evident, at least, that if the expedition of Maternus was a reality, and was truly reported by Marinus, of which there is no reason to doubt, Ptolemy's position of Agisymba cannot have been near the truth.

In this and many other instances, Ptolemy had probably computed his positions from the vague reports of ignorant men; and of his work in general we may say, perhaps, that it was too ambitious an attempt for ancient science, tables of positions by longitude and latitude being the perfection of geography, and which cannot be free from numerous errors, until geography is in a much more advanced state than the imperfect means of the ancients admitted. In many places, moreover, the text of Ptolemy is evidently corrupt: nevertheless, it is from him alone that we can estimate the extent of the geographical knowledge of North Africa obtained by the ancients. His work, like maps and geographical books in general, was, as he himself informs us, an improvement upon the latest, namely, that of Marinus, whose superiority in diligence and learning to all his predecessors Ptolemy fully admits, while subjecting him to a severe criticism. But Ptolemy had an advantage over Marinus in residing in a city, which, for near five centuries, had been the principal seat of science in the ancient world. He had at his command the famous library, in which was probably to be found all that the Greeks of Egypt had ever known of African geography, as well as all that the arms and commerce of Rome may have disclosed; and as science began rapidly to decline soon after the time of Ptolemy, his work may be supposed to contain the result of all that the ancients ever knew upon the subject.

In order to show the extent of his information on the interior of North Africa, I shall here subjoin a translation of a part of the sixth chapter of his fourth book; and, in order to allow of an easy comparison of its results with our own geographical knowledge of the same country, I have inserted on the most recent map the course of the rivers and the positions of the towns and mountains noticed by Ptolemy, according to his latitudes and longitudes, taking only his differences of longitude without reference to his

first meridian, and as he has made the breadth of North Africa between the western coast and the Nile too great by 5°, I have endeavoured to lessen the effect of the error by measuring all his longitudes in the eastern half of the continent from the meridian of Alexandria, and all those in the western half from that of Cape Arsinarium, which I assume with Rennell to have been the present Cabo Verde, and with the more confidence, as we find that Ptolemy's difference of longitude between Arsinarium and Carthage is very nearly correct according to that assumption.

'Interior Libya,' says Ptolemy, 'is bounded on the north by 'the two Mauritaniæ, by Africa, and by the Cyrenaica,—on the 'east by Marmarica, and by the Æthiopia which lies above Egypt, '—and on the south by Interior Æthiopia, in which is Agisymba. 'The eastern extremity of the latter boundary is in E. long. 51.15 'and S. lat. 3 (6), and its western end at the Hesperian, or great 'gulf of the exterior sea in long. 14, lat. 4*. On the west, the 'boundary is the Western Ocean from the Hesperian Gulf to the 'frontier of Mauritania Tingitana.' In this sea-coast, to the southward of Tingitana, are the following positions: †

	E. Long.	N. Lat.
Mouth of the Subus	9. 0	25
Mouth of the Salathus	9.20	22
Mouth of the Chusaris	10. 0	21.40
Mouth of the Nuius	10. 0	18.20
Cape Soloeis	9.30	17.30
Mouth of the Massa	10.30	16.30
Mouth of the Daras	10. 0	15. 0
Promontory Arsinarium	8. 0	‡13. 0
Promontory Ryssadium	8.30	11.30
In the Hesperian Bay.		
Mouth of the Stachir, or Trachir	9.30	11. 0
Mouth of the Nia	13.30	9. 0
Hesperii Ceras	13. 0	8. 0
Mouth of the Massitholus	14.30	6.20
Hippodrome of Æthiopia	14. 0	5.30
The chief mountains of Libya are Mount Mandrus, from whence flow all the streams from Salathus to Massa;—the middle of the mountain	14. 0	19. 0
Mount Sagapola, or Salapola, from which flows the Subus;—middle of the mountain	13. 0	22. 0

* τὸν Ἑσπέριον μέγαν καλούμενον κόλπον τῆς ἐκτὸς θαλάσσης. In the Latin version the lat. is 5°.

† I have omitted some of the positions as not essential to the inquiry.

‡ 12° Lat. version. There are many variations in the two texts as to *minutes*, which are not worth notice.

	E. Long.	N. Lat.
Mount Ryssadius, from which flows the Stachir, making near it the lake Clonia;—the middle of the mountain (or lake?)	17. 0	11. 0
The mountain called the Chariot of the Gods, which gives rise to the Massitholus	19. 0	15. 0
Mount Caphas, from which flows the Daratus;—its middle	17. 0	10. 0
Mount Usargala, from which flows the Bagradas;—its middle	33. 0	20.20
This river flows through Africa into the sea, near	34. 0	32.40
Mount Girgiris, in which the Cinyps rises, having one source in	40. 0	21. 0
and another in	45. 0	21. 0
and their junction at	42. 0	25. 0
Mount Thala, the middle of which is at	38. 0	10. 0
The mountain called the Γαραμαντικὴ φάραγξ, or Garamantic ravine	50. 0	10. 0
Mount Arvaltes, or Argaltes	33. 0	3. 0
Mount Arangas	47.30	2. 0

In the interior the two greatest rivers are the Geir and the Nigeir.		
The Geir unites Mount Usargula with the Garamantic pharanx. A river * diverges from it at	42. 0	16. 0
and makes the Lake Chelónides, of which the middle is in	49. 0	20. 0
This river is said to be lost under-ground, and to re-appear, forming another river, of which the western end is at	46. 0	16. 0
The eastern part of the river forms the Lake Nuba, the site of which is	50. 0	15. 0
The Nigeir joins the mountains Mandrus and Thala, and forms the Lake Nigrites, of which the position is	15. 0	18. 0
This river has two northerly divergents to the mountains Sagapola and Usargala to the east, one divergent to the Lake Libye, the site of which lake is	35. 0	16.30†
and to the south, one divergent to the river Daras, at two positions	26	17
and	24	17‡

* ἐκτραπεὶς ποταμός.

† Καὶ πρὸς ἄρκτους ἐκτροπὰς δύο ἐπί τι τὸ Σαγαπολα ὄρος καὶ ἐπὶ τὸ Οὐσάργαλα ὄρος· πρὸς ἀνατολὰς δὲ ἐκτροπὴν μίαν ἐφ᾽ ἧς λίμνην Λιβύην ἧς θέσις—λι—ις. Here it seems necessary to read either ἐπὶ τὴν, or λίμνη Λιβύη, in either case the divergent led to the lake Libye.

‡ In the Latin, 21—17, and 21—13.30.

	E. Long.	N. Lat.
In the country above the Nigeir the following cities are dispersed:		
Talubath	18.20	22.20
Malacath	20.20	20.15
Tucabath	18. 0	19.30
Bintha	20.15	21. 0
Below the Nigeir.		
Anygath	20.30	14. 0
On the river on its northern side.		
Pessidē	19. 0	18. 0
Thige	21. 0	17.30
Cuphe	23.15	18. 0
Nigeira Metropolis	25.20	17.20
Vilegia	28.30	17.20
Tagama	30. 0	17. 0
Panagra	34-16*	16.20
On the southern bank of the river.		
Thupæ	36.30†	16.40
Punse	18. 0	17. 0
Saluce	19.30	17. 0
Thamondocana	23. 0	17. 0
Dudum	31. 0	15. 0
Below the river Geir.		
Geira Metropolis	36. 0	18. 0
Upon the river to the north.		
Thycimath or Ucymath	38. 0	19.20
Gēūa	39. 0	19. 0
Badiath	40. 0	17. 0
Ischerei	41.30	16.30
Tucrumuda	41.30	15.30
Thuspa or Thuppa	43. 0	17.20
Artageira	44. 0	18. 0
Rubune	46. 0	19. 0
Lynxama	48.30	20. 0

There are two remarkable expressions in the Greek text of this extract, which it is essential to consider with a view to the exact meaning of the author:—1. ἐκτροπή, which, in the Latin translation, is divertigium, and may be rendered in English by the word divergent. Ptolemy employs it simply to indicate the point of junction of two streams without any reference to the course of their waters. Thus he equally applies it to the point of partition of the branches of the Nile in the Delta, and to the junction of the tributaries which descend into the Danube, as the Tibiscus or

* In the Latin 31—0. † Ibid. 26—30.

Teiss, and the Aluta or Alt. 2. ἐπιζευγνύων. After having stated that the Gir (Γεὶρ) and Nigir (Νίγειρ) are the two principal rivers of the interior of Libya, he describes the one as ἐπιζευγνύων, uniting or yoking together, the mountain called the Garamantic pharanx with Mount Usargala, and the latter as uniting, in the same manner, Mount Mandrus with Mount Thala. Such a singular description of a river can only have had reference to the circumstance of these waters having been, as he describes them, rivers of the interior, ἐν τῇ μεσογείῳ, that is to say, rivers beginning and ending in the interior, without any communication with the sea, for such it is evident that he considered both of them to have been. If two opposite branches of a river, rising in two very distant mountains, flow to a common receptacle, the whole may be described as joining the two mountains. To the forks of the several branches of such rivers the word ἐκτροπὴ was particularly apposite, as it left the author irresponsible as to the course of the water in the branch turning off from the main stream. Sometimes it may even be supposed to leave an uncertainty as to which of them was the main stream.

We are not yet sufficiently acquainted with the Quorra to identify any of its ἐκτροπαὶ, or divergents; and even when we have sufficient data to institute the comparison, the imperfection of the information upon which Ptolemy founded his positions will, probably, still leave those particulars in obscurity. It may be fairly presumed, however, that the ἐκτροπαὶ to the mountains Sagapola and Usargala were two ascending divergents or tributaries flowing into the Quorra from the mountains which lie to the northward of it, and that the southerly divergent was a similar branch from that quarter, Ptolemy having, perhaps, mistaken its origin in the same mountain, which gives rise to the Daras, for a communication with that river. Of the general direction of the current of Ptolemy's Nigir there can be no doubt, since the latitudes and longitudes of the several towns on its banks prove a general bearing of east and west; while the description of it as a river of the interior, confirmed by the fact of his not having named it among the rivers which join the western coast, leave the inevitable consequence that he supposed it to flow from west to east.

The Lake Libye, to which there was an easterly divergent, I strongly suspect to have been the Lake Tjad, notwithstanding that the position of Libye falls 300 G. M. north-westward of this lake, for the name Libye favours the presumption, that it was the principal lake in the interior of Libya; it was very natural that Ptolemy, like many of the moderns, should have been misinformed as to the communication of the river with that lake, and that he should have mistaken two rivers flowing from the same ridge in opposite directions to the Quorra and to the Tjad, (I

allude to the Sakkatú river and the Yéu,) for a single communication from the Quorra to the lake.

We now know, indeed, that the river does not communicate with the Tjad; that it is not a river of the interior, in Ptolemy's sense; that its sources are in a very different latitude from that which he has given, and its course very different from that enormous extent of easterly direction which results from his positions of the towns on its banks. But we have very recently obtained this knowledge, and it is nevertheless remarkable, that the difference of longitude between his source of the river and the western coast is the same as that given by modern observations,—that Thamondocana, one of the towns on his Nigir, is exactly coincident with Timbuktú, as recently laid down by M. Jomard from the itinerary of M. Caillié,—that the length of the course of the river resulting from Ptolemy's positions is nearly equal to that of the Quorra, as far as the mountains of Kong, with the addition of the Shadda or Shary of Funda; and that his position of Mount Thala, at the south-eastern extremity of the Nigir, is very near that in which we may suppose the Shadda to have its origin. So that it would seem as if Ptolemy, like Bello and other modern Africans, had considered the Shadda as a continuation of the main river, though he knew the Egyptian Nile too well to fall into the modern error of supposing the Nigir to be a branch of the Nile. The mountains of Kong, and the passage of the river through them at right angles to their direction, formed a natural termination to the extent of the geographer's knowledge, in like manner as among ourselves the presumed and at length the ascertained existence of those mountains has been the chief obstacle to a belief, that the river terminated in the Atlantic.

The preceding attempt to show, that Ptolemy's information on the Djolibá or Quorra, although extremely imperfect, was real, will not appear superfluous when it is considered, that the celebrated French geographer, M. Gosselin, came to the conclusion, that the ancients possessed no knowledge of North-western Africa southward of the river Nun,* and that M. Walckenaer sums up the result of his learned researches in the following words:—' Il est démontré d'après tout ce que nous avons ' dit, que le Nigir et le Gir, tracés sur la carte de Ptolémée, ' n'appartiennent pas au Soudan, mais aux contrées qui sont im- ' médiatement au sud de l'Atlas, et qu'on ne peut tirer aucune

* In the work of M. Gosselin, entitled, 'Recherches sur la Géographie systématique et positive des Anciens,' and in the twenty-sixth section of the Geographical System of Herodotus by Rennell, will be found the opposite arguments on the question of the degree of knowledge of the western coast obtained by the ancients, and particularly on the Periplus of Hanno.

'lumière de ce géographe, ni d'aucun autre auteur ancien, pour 'ce qui concerne le Joliba ou Niger, ou les autres rivières du 'Soudan, puisque cette région a été inconnue à toute l'antiquité, 'et fut réellement une découverte des Arabes.'

The principal grounds of this opinion are,—1. That, according to Strabo, the Nigritæ and Pharusii, who were said to have destroyed the Tyrian settlements on the coast of the Atlantic, and who were adjacent to the western Æthiopians, were distant only thirty journies from Linx or Lixus, now El Araïsh, on the western coast of Marocco, not far to the southward of Cape Spartel. 2. That Pliny places the same Pharusii near the Canarii and Perorsi, who were subdued by Suetonius Paullinus, when, soon after having crossed Mount Atlas, he arrived at the river Ger, (in some MSS. Niger.) 3. That Ptolemy also places the Nigritæ, Perorsi and Pharusii in the vicinity of one another, and the Nigritæ on the northern side of the Nigir, from which they took their name,—consequently that the Νίγειρ of Ptolemy was the same as the Ger of Pliny; and the latter having been only a few miles from Mount Atlas, and the Nigritæ and Pharusii only thirty journies from Lixus, that the Nigir, and the several people just named, were all on the northern side of the Great Desert. 4. That in like manner the conquests of Cornelius Balbus did not extend beyond Ghadámes, Fezzán, and Kawwár, Pliny having had no knowledge of any country farther to the south, except that of the Blemmyes, or people of Bilma, whom he knew only by name, as appears evident from his representing them as wearing their faces upon their breasts.

Now, it may be readily admitted that Strabo had no knowledge, or at least that he placed no confidence in any information which may have reached him as to the countries more southerly than Fezzán, since he remarks of those situated beyond Garamantia, the Oases of Egypt, and the Ammonian Oasis, that 'numerous 'intervening deserts prevented any exact knowledge of them from 'being obtained, and consequently that he could not state what 'were the boundaries of Æthiopia and Libya, even in the parts 'adjacent to Egypt, still less in regard to the Æthiopians who 'bordered upon the ocean.'* But if he was so ignorant of Libya, and particularly of the position of the Western Æthiopians, of what validity is his testimony that the Nigritæ and Pharusii, whom he expressly states to have been near those Æthiopians, were only thirty journies distant from Lixus, particularly as he accompanies the remark with the doubtful word φασὶ, and with an incredible account of the productions of Mauritania, such as weazles as large as cats, leeches ten feet long, and, among other animals, the crocodile,† which there can scarcely be any river of

* Strabo, p. 839.

† Ibid. p. 826.

Marocco capable of nourishing, even if the climate were adapted to it? * In another place, Strabo shows that the Pharusii had a great desert between them and Mauritania, which caused the intercourse to be rare, and which the Pharusii crossed, like the natives of the present day, with bags of water suspended under the bellies of the horses.† It is evident that there is a contradiction in these two accounts, and that the latter cannot apply to any place near the sea-coast, at a distance of thirty days from El Araïsh, because the kingdom of Marocco and the ridges of Atlas extend further than that distance. As to the river Ger, which Paullinus reached after crossing Mount Atlas, and a desert of black sand and burnt rocks, it appears to have been either the Darha or the Nun; for Pliny shows the latter river to have been in, or very near, the country of the Canarii, who dwelt opposite the Μακάρων Νῆσοι, or Fortunate Islands, one of which was called Canaria, ‡ and has given the collective modern name to them all.

The Nigris of Pliny was obviously a very different river, both in its nature and position, from the Ger of the same author. It was situated to the southward of the great desert, on the line separating Africa from Æthiopia; and its magnitude and productions, but more particularly the period of its greatest fulness, cannot possibly be made to correspond to any of the inconsiderable rivers which descend from Mount Atlas. Those streams may perhaps produce the calamus and papyrus, but it is very improbable that the hippopotamus was ever a native of any of them, or even the crocodile; and it is certain that they do not swell at the same season as the Nile of Egypt, being fed, not by tropical rains, falling in greatest quantity near the summer solstice, but by the waters of the maritime ridges, which are most abundant in winter.§

Setting aside, then, the thirty journeys of Strabo between Lixus and the Pharusii, as an error either of his information or of the text, which latter is not improbable, as numbers in MSS. are

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* In Egypt, where the average heat is equal to that of Senegambia, the crocodile is seldom seen so low as Siout.

Pliny, l. viii. c. 1, 11. agrees with Strabo in asserting that Mauritania produced elephants. As the whole of Barbary is more European than African in its climate and productions, it may be doubted whether the elephant, which is no longer found there, was ever indigenous, though it may have been naturalized by the Carthaginians, to whom elephants were of importance as a part of their military establishment. Appian informs us (de R. Pun. c. 9.), that when preparing for their last war with the Romans, they sent one of their leading men—Asdrubal, son of Gisco—to hunt elephants, ἐπὶ θήραν ἐλεφάντων ἐξέπεμπον. It is not to be imagined that Gisco went into Æthiopia for this purpose, as he could not, in that case, have executed his mission in less than six months.

† Strabo, p. 828. ‡ Ibid. p. 8, 150.—Plin. H. N. l. vi. c. 32.

§ Nigri fluvio eadem natura quæ Nilo; calamum et papyrum et easdem gignit animantes, iisdemque temporibus augescit. Plin. l. 5, c. 8.

so often corrupt, we shall find that Strabo, Pliny, and Ptolemy, are in perfect agreement with one another as to the situation of the several people of the western part of North-Africa. The Gætuli, whom Strabo describes as the greatest of the Libyan nations, occupied the whole of that vast tract of country called Bilad-ul-jerid, which extends from the Garamantes, now Fezzán, to the south-western extremity of Mount Atlas, where they bordered upon the Maurusii.* The ridges of Atlas bounded them on the north, and the great deserts on the south. The Canarii, as I before hinted, occupied the country opposite to the Canary Islands. The Perorsi inhabited a few fertile spots spread over a long extent of maritime country between the Canarii and the Pharusii, the latter of whom occupied the banks of the Senegal, and were bordered towards the interior by the Nigritæ, dwelling between the river Nigris and the great desert.†

As to the account of the Nile and Nigir, which Pliny received from the second Juba of Numidia, it is derived from that absurd notion on the identity of all the waters of North-Africa, which has been prevalent in that country in all ages, and it only proves the low state of geographical science at Rome, as well as the ignorance and credulity of the African prince, notwithstanding his reputation for learning.‡ He reported that the Nile had its origin in a mountain of Lower Mauritania, not far from the Ocean, in a stagnant lake called Nilis, — that it flowed from thence through sandy deserts, in which it was concealed for several days, —that it reappeared in a great lake in Mauritania Cæsariensis,— that it was again hidden for twenty days in deserts,—and that it rose again in the sources of the Nigris, which river, after having separated Africa from Æthiopia, and then flowed through the middle of Æthiopia, at length became the branch of the Nile, called Astapus. The same fable, though without any mention of the Nigir, is alluded to by other authors;§ and as one of them adds,|| that the river, at its source, was called Dara, that which flows through the country, still called El Darha, from Mount Atlas into the Desert, would seem to be the stream which had the honour of being the reputed commencement of the Nile.

As it is obvious that if the Nigir of Ptolemy was one of the rivers at the foot of Mount Atlas, he has assigned to it a latitude at least 12° more southerly than the reality, it may be right to consider what probability there is of his having been guilty of this error.

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* Strabo, pp. 826, 829, 835, 838.

† Plin. l. 5, c. 8.—Ptolem. l. 4, c. 6.—Strabo, pp. 131, 826, 828.

‡ Studiorum claritate memorabilior etiam quam regno. Plin. l. 5, c. 1.

§ Vitruv. l. 8. c. 2.—Æthici Cosmog.—Strabo, p. 826.

|| Mela de Situ orbis, l. 3. c. 9.

In favour of the supposition, it may be alleged, that in referring to his positions on the branches of the Nile, we find that the lake Coloe, assuming it to be the same as the Dembea of Abyssinia, is just 12° to the south of the true latitude, as observed by Bruce, that the sources of Ptolemy's Nilus (the Bahr el-Abiad) are about the same distance beyond their probable situation: that Carthage is 4½°,* and Garama 5° to the southward of their real latitude, and Agisymba, if I am right in the inference drawn from the march of Maternus, not less than 25° to the southward of its true position. All these undoubtedly tend to justify a belief of an erroneous southerly extension throughout the interior of North Africa, and render more probable, therefore, the error in Ptolemy's position of the Nigir. On the other hand, we find that his latitude of the city of Meroe is true within half a degree, when applied to the ruins near Shendy, while the difference between its meridian and that of Alexandria is not more than 2° or 3° in defect, according to the best modern observations, which may not themselves be quite correct. His difference of longitude between Arsinarium and Carthage is exact to within half a degree;—the 'great gulf of the exterior sea,' as he calls the Gulf of Guinea, is truly described by him as beginning at the latitude of 4° or 5° north; and, although he places Arsinarium 2° too far to the south, the differences of latitude and longitude, and the order of the rivers and capes, can leave no doubt that the ancient Soloeis, or Solventia, was Cape Blanco,—the river Daras, or Daratus, the Senegal,—the river Stachir, or Trachir, the Gambia,—and the river Nia the Rio Grande.† And thus the arguments in favour of the identity of Ptolemy's Nigir with the Quorra may be succinctly stated as follows:—He believed that the earth was spherical; he divided the great circle into 360°; of these degrees he placed the same number in the breadth of North Africa that modern observations confirm;—in the length of the same country he erred only one-tenth in excess. And in the interior, proceeding from a point of the western coast, where his positions approximate to modern geography, he placed a great river, flowing from west to east, exactly in the latitude where the Quorra flows in that direction.

But still, perhaps, it may be alleged, that although Ptolemy may have been tolerably well informed as to the outline of North Africa, he may have been quite ignorant of the interior, and that the coinci-

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* As it is very difficult to conceive that the relative longitude of Carthage, with reference to the two extremities of North Africa, should have been better known than its latitude,—or that the latter should not have been as well known as that of Alexandria or Leptis, and the Syrtis, which are correctly given by Ptolemy,—it is possible that there may be a textual error in Ptolemy's latitude of Carthage.

† It seems not at all improbable that the information of Ptolemy on the coast, and, perhaps, also on the interior country, in the same latitudes, was derived from Carthaginian authorities.

dence just mentioned, upon which the question depends, may have been accidental;—it remains, therefore, to be seen what proofs he has given of having approached to a knowledge—for a correct knowledge will hardly be expected—of other parts of the interior. Besides the position of Meroe, already alluded to, we find that he has accurately indicated the three branches of the Nile forming the peninsula called the Island of Meroe, although the situation of the junctions may not bear strict examination; and that, upon the whole, his positions on the Nile, as far as Meroe inclusive, are unquestionably founded upon celestial observations, although beyond that country he has evidently depended upon itineraries and oral description alone, the very common effect of which is erroneous extension by the overrating of computed distances. A similar result from Ptolemy's positions is observable in all the countries which were least known to civilized antiquity; and it is undoubtedly to the same cause that we must attribute the great easterly error, which so long prevailed among the moderns, regarding the longitude of Timbuktú, that longitude having been assumed from itineraries beginning in the western coast.

Can the same cause have induced Ptolemy to place the Nigir 12° to the southward of its real latitude? It is difficult to believe so, since although an error in the relative longitudes of Arsinarium, now Cabo Verde, and Cape Κώτεις, or Cotta, now Spartel, which is placed 2° to the westward instead of 13° to the eastward of the former promontory,* have given in Ptolemy's map a false outline to the whole of the north-western extremity of Africa,† the latitudes of most of the places on this coast which can be identified, and even some of the differences of longitude, approximate to the reality sufficiently, at least, to show the extreme improbability of his information on the interior having been so erroneous as to cause him to represent one of the small streams, which have a course of one or two hundred miles from Atlas into the desert, chiefly in a southerly direction,‡ as a great river having a course of more than a thousand miles from west to east. Another strong reason for thinking that Ptolemy could never have been guilty of such a capital error, is, that he connects his Nigir with the river Daras, which flowed into the sea in latitude 15° N. and 2° to

* Πρόπους ἐκκειταί τις ὕστατος πρὸς δυσιν τῆς Μαυρουσίας αἱ Κώτεις λεγομέναι, &c.—Strabo p. 825. Ptolem. l. 4, c. 1. Cotta—Plin. l. 5, c. 1—l. 32, c. 2.

† A delineation formed from Ptolemy's positions may be seen in Rennell's Geography of Herodotus, section 26.

‡ According to the scanty notices which we have of the country on the southern side of the range of Atlas, there is a river in each of the districts of Darha, Tafilet, and Sidjilmassa, in the kingdom of Marocco, and in that of Algiers the Wady Djeddi, which Shaw supposed to be the Ger visited by Suetonius Paullinus. Caillié, who passed through the middle of Tafilet, mentions only a rivulet; and as all that country partakes of the dryness of the Bilad ul jerid, it is probable that none of its rivers are large.

the east of Cape Arsinarium, as well as with Mount Mandrus, from which flowed the Massa, which joined the sea not far to the northward of the Daras.

Again, if we compare Ptolemy's description of the central part of Æthiopia, or that lying between the Nile and the Nigir, with modern discoveries, we find reasons for concluding that he had acquired an obscure knowledge of it similar to that which he had obtained as to the countries near the Nigir, and similar also to that which had reached modern Europe prior to the discoveries of Denham and Clapperton. The principal river of central Æthiopia was the Γείρ, or Gir, which Ptolemy describes as uniting (ἐπιζευγνύων) the mountain Usargala with that called the Garamantic pharanx. As the former lay to the north-west of the latter, and the river in its progress had divergents which formed lakes lying to the northward of the Garamantic pharanx, it is evident that the latter mountain gave rise to the river, and that its general course was from S. E. to N. W. In this important particular, therefore, the Gir agrees with the Shary of Bornú: but it agrees also with another great stream, the existence of which can no longer be doubted, called Misselád by Browne, and Om Teymám by Burckhardt.

As the Garamantic pharanx falls nearly in the longitude and latitude (perhaps a little more northerly) of the probable situation of the sources of the Om Teymám, there is a presumption that this river, rather than the Shary, was the Gir of Ptolemy; and this presumption is supported by the name Djyr;—in fact, the identical name of Ptolemy which, according to Burckhardt, is attached to a country on the banks of the Om Teymám and to the river itself, Om Teymám being the Arabic and Djyr the indigenous appellation. Burckhardt adds that the country produces ebony, which agrees exactly with one of the attributes given to the Gir by Claudian, who, as an African, is a good authority on such a question, though, like an African, he has confounded all the rivers of the country with the Nile, and has represented both the Girrhæi and Garamantes as drinking its waters:—

> Hunc bibit infrænis Garamas, domitorque ferarum
> Girrhæus, qui vasta colit sub rupibus antra,
> Qui ramos ebeni, qui dentes vellit eburnos.*

But that Claudian himself was conscious that he was only repeating a fable in these lines of his Idyllium on the Nile, is evident from the words in his graver poem on the first consulship of Stilicho, where he represents the Gir as a separate river, rivalling the Nile in magnitude,—

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* Claudian. Idyll. in Nilum, v. 19.

Gir notissimus amnis
Æthiopum, simili mentitus gurgite Nilum.*

It is inconceivable that Claudian should here have alluded to the Ger of Pliny, at the foot of Mount Atlas, at which Paullinus arrived in a few journies from the maritime part of Mauritania, though it is by no means impossible that he may have intended not the Gir of Ptolemy, but the Nigir; for it must be admitted that, without the other coincidences, the name Djyr would not of itself have been of much weight, being probably a generic word, like Ba, Bahr, Gulbi, Quorra, Gambarú, Tjad, Enzaddi,† Shadda, or Shary, in the present day, and like Nil in all ages as applied to the rivers and other waters of North Africa. Thus the Ger of Pliny near the foot of Mount Atlas, the Gir of Ptolemy in central Æthiopia, and the Nigir itself, are evidently generic words, meaning, probably, river or water. With regard to the Ni, in the composition of the word Nigir, several conjectures may be offered. It may be an article or prefix of the same force as the N', which we find in several names reported by Denham and Caillié, the latter of whom notices a lake called N'gher, near the Senegal, which seems to be exactly the same word as the ancient Nigir. Or Ni may be equivalent to the Niu in the Ba-niu, White River, which, with Ba-lio, or Black River, are, according to an informant of Clapperton at Sakkatú, the names of the two divergents of the Quorra, which form an island below Sego. In this case Nigir would mean White River;—or, finally, Nigir may be Nil-geir, like the Bahr Nil of Egypt, meaning perhaps nothing more than river-river, or water-river.

These remarks are not altogether unnecessary, since more than one celebrated writer has fallen into the error of supposing Niger a Latin word, though the Nigris of Pliny and the Νίγειρ of Ptolemy might have undeceived them. The real etymology of the name leads also to an explanation of one cause of the common belief of the Africans, that all the waters of their country flow to the Nile; for those generic words, and particularly that of Nil, appear to have been occasionally applied to them all.

I shall not attempt to identify the lakes Chelonides and Nuba of Ptolemy, which would only be *obscurum per obscurius* as long as our own information on the countries between Bornú and Darfúr is so extremely imperfect,—still less to explain what he meant by the Bagradas and Cinyps, two rivers bearing the same name as two others flowing into the Mediterranean, but which he distinguishes from the latter by giving the names and positions of the

* Claudian in Pr. Consul. Stilich. lib 1, v. 252.
† The name of the Congo river according to Tuckey.

mountains in which the rivers of the interior originated, as well as those in which the maritime streams had their sources. Possibly the interior rivers received their appellations from an imaginary communication underground with the maritime. It is on the interior Cinyps that Ptolemy places Sabæ, now Sebha, and Garama; though, as I have already hinted, his position of them is more than 300 miles to the southward of the reality, and though the reports of modern travellers do not countenance a belief of the existence of any river at all in Fezzán.

But admitting that in these and other particulars Ptolemy was certainly misinformed, there still remains enough, in his data on Interior Libya and Northern Æthiopia, to show a real geographical approximation, very distant indeed from the accuracy at which science is always aiming, but quite sufficient to resolve the question as to the identity of the Nigir, in which an approximation is all that can be expected or required. Having been totally ignorant of the countries through which that river flows in a southerly direction, Ptolemy naturally mistook it for a river of the interior: he knew the middle Æthiopia to be a country watered by lakes, formed by streams rising in mountains to the southward;—he was superior to the vulgar error of supposing that all the waters to the westward of the Nile flowed into that river, and he knew, consequently, that the rivers and lakes in the middle region had no communication with the sea. It is but lately that we have ourselves arrived at a certainty on this important fact. We now know enough of the level of the lake Tjad to be assured that no water from that recipient can possibly reach the Nile. This wonderful river, of which the lowest branch is 1200 geographical miles from the Mediterranean, (measuring the distance along its course, in broken lines, of 100 G. M. direct,) has no tributary from the westward below the Bahr Adda of Browne, which is more than 1600 miles from the sea, similarly measured. It is scarcely possible, therefore, that the latter point can be less, taking the cataracts into consideration, than 1500 feet above the sea; whereas the following considerations lead to the belief, that the Tjad is not more than 500 feet in height:—*

We learn from the information of Clapperton, confirmed and amplified by that of Lander, that there exists a ridge which, about Kano and Kashna, sends forth the Yéu to the lake Tjad on one side, and, on the other, the river of Sakkatú, which joins the Quorra at a distance from the sea of about 500 miles, measured in the manner above-mentioned. A similar process of measure-

* The barometrical data of Dr. Oudney produce, indeed, a higher elevation; but, as he had 'doubts of the accuracy of his barometer,' no great reliance can be placed on these data.

ment gives a length of 1700 miles to the whole course of the Quorra, the sources of which, according to Major Laing, are about 1600 feet above the sea; the stream, therefore, has an average fall of something less than a foot in a mile, on lines of 100 G. M. This would give to the confluence of the river of Sakkatú with the Quorra a height of less than 500 feet above the sea, but as that confluence occurs above the most rapid part of the main stream, 500 feet seems to be very nearly the height.

It is not probable that the lake Fittre is very different in its level from the lake Tjad, nor any other lake which may exist between Bornú and Darfúr, and which may be formed, in the same manner as the Tjad, by rivers flowing from the same range of mountains in which the Shary has its sources. As to the Wady, or Dry River, at the eastern extremity of the lake Tjad, of the existence of which Denham convinced himself by information obtained very near the spot, it is obvious that even if this were an outlet to the Nile, its contribution to that river could only be small and casual, since the same information proves that the Wady seldom contains any water. Possibly it is an occasional communication through the Bahr el Ghazél to lake Fittre, nature having, perhaps, provided for the irrigation of all the parts of Æthiopia northward of the great range of mountains, and lying between the Nigir and the Nile, by rivers terminating in inundations, which diminish in the dry season, when some of them may be totally dry, like the Taka to the eastward of Shendy, which was visited by Burckhardt; while others may be only partially dry, like some of the recipients on the southern side of the mountains of Barbary, and like many basins on the outskirts of the valley of the Nile.* It is not impossible that all the lakes between Háussa and Darfúr may have Wadys of communication from one to another, which may generally be dry, like the Wady of the Tjad, but may serve, in case of the superabundant inundation of one river, to spread the water equally over all the lower parts of this extensive country.

I am aware that many persons are of opinion that the freshness of the water in the lake Tjad is a proof of its having a stream flowing from it, on the principle that as all rivers hold saline particles in solution, the saltness of the lake will continually increase if there be no expenditure but by evaporation. But although the theory may be correct; although lakes, without outlets, having steep margins, which prevent any enlargement of surface, may thus become strongly impregnated with salt, shallow lakes, formed by periodical inundations, like the greater part of those in North Africa, may be very differently affected. Here a great part of the

* Shaw informs us that one of those recipients on the southern side of the Algerine mountains was called Shott, which seems to be only a dialectic variety of the same word pronounced Tjad, or Djad, in the southern countries.

salt being left on the margin, as the evaporation takes place, is absorbed by the vegetation, while the salt in the permanent part of the lake will keep that water at the bottom by its weight, when the inundation takes place, or, at least, will cause it to be only partially mixed with the new supply,—so that the upper surface of the lake will be always nearly, if not quite, as fresh as the river which forms it. That, in fact, all such lakes are fresh, or nearly so, notwithstanding their having no outlet, may be shown from a multitude of examples. It is sufficient to mention the Zurra in Persia, which is formed by the river Helmund, by the Greeks called Etymander, the lakes Nessonis and Bœbeis in Thessaly, the lake Mæris in Egypt, and a series of lakes which, with the streams flowing into them, occupy a length of two hundred miles in the interior of Asia Minor. These last form an exact parallel with the Tjad, in having, at no great distance from them, salt lakes, and a large tract of country producing salt on the surface,—facts which furnish the further proof that a great degree of saltness in lakes depends neither upon outlets nor margins, but upon local causes, as we see exemplified in the Dead Sea, of which some of the cliffs are of solid salt.

The evidence which Ptolemy has left us of his knowledge of the general structure and hydrography of the Bilad-es-Súdan, as well as of Meroë and the three great tributaries of the Nile, render his testimony on the origin of the western branch of that river the more worthy of attention, notwithstanding the enormous southerly extension, which he has given to the Astapus, or Blue River, and, therefore, in all probability, to the Nilus, or White River also. In considering the latter as the real Nile, he agrees with Herodotus, inasmuch as the historian states, that the Nile came from the westward, and that the Automoli dwelt at a distance above Meroë, which was equal to that of Meroë above Elephantine,* thus placing the Automoli on the White Nile, in the country now inhabited by the Denka. Under the Ptolemies, the Greeks had already exploded the vulgar error which prevailed in the time of Herodotus, of supposing that the rivers of Western Africa flowed to the Nile. About 220 B.C. Eratosthenes, the librarian of Alexandria, had a knowledge of the entire course of the river more correct than has been attained by moderns until within a few years;† and upon comparing his remarks with those of Arte-

* Herodot. l. 2, c.30, 31.

† Eratosthenes was well informed on the course of the Nile above Egypt, and particularly as to the great south-western bend of Dongola, which was scarcely known, to the moderns before the journey of Burckhardt into Nubia. It was from Eratosthenes that Strabo derived his information on the peninsula of Meroë, and it was probably from the same source that Artemidorus, of Ephesus, learnt that the city of Meroë was fifteen days distant from the sea. Eratosthenes described the island of Meroë as formed of two branches of the Nile, named Astaboras, now Atbara and Astapus; but added, that the latter was sometimes called Astasobas, while the name Astapus was

midorus, Strabo, and Ptolemy, it appears that not much information was ever added to that of Eratosthenes, either on the Nile or on its branches, which form the great peninsula of Meroë,—or island of Meroë, as the Greeks called it,* in the same manner as the peninsula above the confluence of the White and Blue Rivers, is now called the island of Sennaar. As Eratosthenes agrees with Ptolemy in placing lakes at the head of both the great branches of the Nile, and as this has been found correct as to the Blue Nile, there is some reason for presuming that the Proper or White Nile may have a similar origin; and if we suppose Ptolemy to have placed the two lakes of the Nilus, or White River, 12° to the south of their real position, as he is proved to have placed the lake Coloe at the source of his Astapus, or the Abyssinian branch, it will follow that the lakes of the White River are about the latitude of 5° north.

There are only three modern authorities from which we derive any information on this great question of African geography, which, in spite of Bruce, still remains the same problem it has ever been. The first of these is Browne, whose inquiries in Darfúr tend to prove the sources of the river to be about lat. 7°, and long. 27°,—not in lakes, but in many streams, flowing from the Djebel el Kamr, or Mountains of the Moon, which is precisely the name given by Ptolemy to the mountains at the source of the Nile, and which Denham also found attached to a part of the same great range, farther to the west. The second is Linant, who travelled for the African Association, and who, in the year 1827, surveyed the course of the White Nile from the confluence of the Blue

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applied to another river rising in certain lakes to the south, meaning the White River. This agrees with Ptolemy, inasmuch as he clearly attaches the name Astapus to the Blue or Abyssinian Nile, and derives the Nilus, or Proper Nile, that is to say, the White River, from lakes situated far to the south. On the other hand, Artemidorus, Strabo, and Pliny, followed those authorities alluded to by Eratosthenes, who gave the name Astapus to the White Nile, and that of Astasobas to the Blue River. The latter name may be accounted for by the discoveries of late travellers; from whom we learn, that on the right bank of the Bahr el Azrek, or Blue River, a little above the fork at Khartúm, there are some ruins called Soba, apparently of the same age as those of Meroë; whence it would seem that Astasobas meant the river of Soba, and that the Ast, which enters into the composition of this and the two other names of the rivers of Meroë, implies *river*, having probably been introduced into that country by the Egyptian Greeks from Macedonia, where we find its elements, doubtless with the same import, in the names Astræus, Strymon, and, perhaps, also the modern Vistritza. Astapus, in fact, was the name of a Macedonian city (now called Istib), and not improbably of the river, also, upon which that town is situated. When the Blue Nile had generally assumed the appellation of Astasobas, that of Astapus may still have distinguished the united stream as far as the junction of the Astaboras, and may at length have become attached also to the White River above the fork, by a process which has often changed the names of rivers, especially when formed of two nearly equal branches. The Scamander of Troy is a remarkable instance. The Simoeis of Homer was the Scamander of the time of Strabo.

* Eratosth. ap. Strabon. p. 786.—Artemid. ap. Strabon. p. 771.—Strab. p. 821.—Plin. H. N. l. 6, c. 29.—Ptolem. l. 4, c. 8.

River to Aleïs,—a direct distance of 132 geographical miles. But the most recent information has been obtained by a slaving party, headed by Ibrahîm Kashef, an officer of the Viceroy of Egypt, who set out from Khartûm at the fork of the two rivers. The men composing this expedition marched for thirty-five days along both banks of the river,—a portion on each side. On the twelfth day they reached the first island of the Shillûks, traversed the territory of that people for fifteen days, and, on the twenty-ninth day, entered that of the Denka, from which they returned at the end of six days. The river was then shallow, full of islands, six hours in breadth, and there were no mountains in sight. The latter part of the march appears, from the description of Ibrahîm, to have been in a direction nearly west; so that if the first island of the Shillûks, which they reached on the twelfth day, was not far from Aleïs, as Linant's Journal gives reason to believe, the extreme point attained by them was about 29° E. longitude, and 10° N. latitude. The result of the last expedition agrees with that of Browne's, inasmuch as it gives an easterly course to that part of the river which lies to the south of Darfûr; and as it makes the sources of the river to fall to the south-westward of that kingdom not farther northward than 7° N. It supports the opinion, also, that Browne's Donga is no other than the country of the Denka; that both the sources and mountains are more distant than Browne's informants supposed; and still leaves the possibility, therefore, that Ptolemy was right in describing the river as originating in lakes. In fact, the enormous breadth attributed to the river by the Turkish slaving party, although it may be an exaggeration, and is certainly not to be reckoned by the usual allowance of the itinerary hour, leaves little doubt that the river, at the extreme point of their journey, was much broader than at its junction with the Blue Nile; and indicates, therefore, that its conformation is of an extraordinary kind,—its origin being, perhaps, in a lake or lakes, which may be supplied by streams flowing from a distant range of mountains.

The existence of lakes having a communication with the river only in time of high water, is rendered highly probable by a passage in the journal of M. Linant, which states, that at the time of the inundation of the White River, an incredible quantity of fish is brought down towards Khartûm by the current.*

As a want of success alone caused the return of the Turkish slaving party,—the natives constantly eluding their pursuit,—it seems evident, that if geographical discovery instead of man-stealing had been their object, they might have explored the river much

* [M. Linant's Report to the African Association having been merely printed for the use of its members, and neither published nor translated, will be found somewhat condensed and abridged, in another part of this volume.]

farther; and that it might consequently be in the power of the Viceroy of Egypt to arrive at the mysterious sources, or to escort an European mission thither, if a motive sufficiently powerful should ever prompt him to assist in the attempt. In the mean time, a route by water, in the direction of the sources of the White Nile, is now afforded from the westward by means of the newly-discovered branch of the Quorra called Shary, or Shadda, or Tjadda, which, being one mile and a half in breadth at its junction with the Quorra, is probably navigable for a great distance above the confluence. It is proper to observe, however, that this stream can hardly carry us very near the sources of the White Nile, as it probably originates not far from the mountain of Mendefy, which Denham saw in latitude 8° N., and which he compares to one of the granite peaks of the Alps; for this Shary is apparently the same river which his informants described to flow through the country of Adamowá, and which he concluded to be a branch of the Shary of Bornú, by the same kind of error as that of Bello and others, who have thought that the Quorra flowed to the lake Tjad,—the error, in both cases, arising from the identity of name, from a want of observation in the natives as to the course of the waters, and from the fact of both the Sharys rising nearly in the same point. Denham was so completely puzzled by this riddle, that having been informed at Loggun that the Shary of Bornú has an easterly branch, (possibly the same river as the Bahr Kulla of Browne,) he supposed it to be a continuation of the river of Adamowá, and to terminate in the lake Fittre.

As a knowledge of the origin and course of rivers conducts, in every country, to that of the relative altitude and direction of its highlands, the late discoveries on the waters of Africa have thrown great light on its orography. The sources of the largest, or rather longest, of its rivers, namely, the White or true Nile, now appear to be in a point nearly equidistant from the Indian and Atlantic Oceans in one direction, and from the Mediterranean and the Cape of Good Hope on the other. These central summits, it is fair to suppose, are at least as high as the snowy peak Samen in Abyssinia, which is the culminating point towards the sources of the minor branch, or Blue Nile, and that they are covered therefore with perpetual snow. From hence flow the White Nile, the Djyr, the Bahr Kulla, the Congo, and several rivers of the coast of Zanguebár.

As a part of these great African Alps was described to Denham as lying beyond the mountain of Mendefy, the latter would seem to be an advanced northerly summit of them. The range is probably united to the eastward with the mountains of Abyssinia, and, to the westward, terminates abruptly in some lofty peaks on the eastern side of the Delta of the Quorra, but not till after it

has sent forth a lower prolongation, which crosses the course of the Quorra nearly at right angles, and terminates, at the end of 1500 miles, at the sources of the Quorra, Gambia, and Senegal. A minor counterfort advances from the central range to the north-westward, commencing about the peak of Mendefy and vanishing at the end of about 900 miles in the desert of the Tuariks. It gives rise to the two Sharys which flow in opposite directions to the Quorra and the lake Tjad, and further north to the streams which flow to the same two recipients from about Kano and Kashna.

Though the knowledge of Interior Africa now possessed by the civilized world is the progressive acquisition of many enterprizing men, to all of whom we are profoundly indebted, it cannot be denied that the last great discovery has done more than any other to place the outline of African geography on a basis of certainty. When to this is added the consideration, that it opens a maritime communication into the centre of the continent, it may be described as the greatest geographical discovery that has been made since that of New Holland. Thrice during the last thirty years it has been on the eve of accomplishment; first, when Hornemann had arrived from Fezzán at Nyffé; secondly, when Park had navigated the Quorra as far as Bussá; and, lastly, when Tuckey, supplied with all possible means for prosecuting researches by water, was unfortunately expedited to the Congo, instead of being sent to explore the mouths of the NIGIR.

II.—*Notes on a Part of the Eastern Desert of Upper Egypt.* Accompanied by a Map. Communicated by J. Wilkinson, Esq. Read the 28th Nov. 1830.

[The following notes are extracted from a manuscript volume of Researches in Upper Egypt, by J. Wilkinson, Esq., the greater part of which consists of remarks on Egyptian antiquities, with reference to a large collection of drawings made by Mr. Wilkinson. With the exception of a journey on the Bahr Yousuf, by means of which Mr. Wilkinson corrects the position of Bahneséh, as laid down on the maps, and places it due west of Abugirge, on the Nile, the only remarks in the manuscript interesting to geography are contained in the following]

JOURNEY IN THE EASTERN DESERT.

IN February, 1823, I set off from Cairo, for that part of the Eastern Desert which lies north of Kéneh, in company with Mr. Burton,* and protracted my stay in those mountains till the

* An abstract of Mr. Burton's journal, transmitted to Mr. Greenough, appeared in the 'Morning Chronicle,' Oct. 23, 1824.

month of June, when I was obliged, by indisposition, to return as speedily as possible towards Cairo.

While at Benisoûef, where we remained some weeks, we caught several crabs, exactly resembling those of our sea, but very small. I have seen many of them also in Nubia, and other parts of the Nile. From Benisoûef we proceeded to the monastery of St. Antony, called, in Arabic, Deïr (convent), Antonios, or Már (Saint) Antonios, a distance of about seventy-six or seventy-seven miles. Our road was, as may be imagined, uninteresting enough. The flatness of the plain* is only interrupted now and then by gentle ascents and descents; a few trees and low shrubs in the beds of torrents, which continually cross it in different parts, were the only agreeable objects; and most of the streams were dried up for want of rain, little (in many places none) having fallen upon these mountains and plains for the last three years.

Wâdy Arabah extends from the beginning of the western extremity of these mountains to the Red Sea, in a direction nearly due east; it is said to have received its appellation from an ancient chariot-road, which our Arabs told us led towards the water of Zaffarána and the sea, but which we never met with on crossing the plain; indeed, on being asked to take us to see it, they confessed they did not know exactly where it was. I think it probable, however, that the remains of some such road may still exist there, and if so, probably near that watering-place. Another sheikh assured me, that there were three roads which led to this water; one of these, he said, takes the direction of Aréidy, but of the others he knew nothing more than that they were marked out and supported by large stones.

At Gebel Aïnnaba † we stopped for water; there are two very good springs three or four miles from the plain; near each of which is one old deserted house, probably built by the monks of the neighbouring convent. The ravines are very fine and bold, and, judging from their depth, much water must fall there in the rainy season. The distance from thence to Deïr Antonios is little less than twelve miles.

The inmates of this convent are Copts, living of course in the

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* There is a gentle ascent from the Nile to that part of Wady Araba, called Wady Abourimth; while, from a little beyond that, the descent to the Red Sea is very rapid. Browne, in speaking of the canal connecting the Nile and Red Sea, in the direction of Cosseir, observes, that the water, if it ever flowed by such a canal, must have run from the Nile to the sea, and not from the sea to the Nile, a remark perfectly in harmony with the observations of every traveller who goes from the river to the Arabian Gulf. Pliny, however, (lib. vi. c. 29.) assures us that the Red Sea was found to be three cubits higher than the land of Egypt; though this difficulty would easily be removed if the assertion of a savant, 'that the Delta is now fourteen cubits higher than 3284 years ago,' could be admitted.

† This should perhaps be Aiñebe, 'a grape.'

most frugal manner, as well from a religious superstition, as from the necessity which their self-banishment in an inhospitable desert has imposed upon them; they are supported by voluntary contributions from the Copts of Egypt. Their principal saint is St. George of Cappadocia, but their patron is St. Anthony, of the Thebais,* the friend and companion † of St. Paul, or Mar Bólos, who founded another monastery, called after his name, distant by the road about fourteen miles to the south-east. Deïr Antonios is about seventeen miles, and Deïr Bólos only nine from the Arabian Gulph. The monks of St. Anthony, so far from being able to give any account of the date of its foundation, do not even know who their founder was; they pretend that 1700 ‡ years have elapsed since the time of his retirement into the desert and the institution of their order; though in truth it happened only about 1516 years ago, in the reign of Constantine. In this alone they were correct, that their founder was a contemporary of that emperor.

Deïr Antonios is inclosed within a wall from thirty to forty feet high; the only entrance is a trap-door, from which the monks let down a rope to those whom they think fit to admit; this permission is never granted to the Arabs, of whom they live in constant dread, and whose forbearance they are obliged to court by presents of wood and provisions when they encamp beneath its walls. The interior resembles the confusion of an Arab village, laid out without any plan or regularity. An insulated tower, defended by a drawbridge, is the keep of the fortification. They have three chapels, one of which they assert to be of the time of Constantine, and, from the general form and style of its architecture, I do not think this improbable. The walls are adorned with old frescos, and some stained glass remains in the windows; there are also several Arabic, Armenian, Coptic, and other inscriptions.

In another chapel are some old pictures, interesting, inasmuch as they show the style of painting in this country in the early times of Christianity. There is also a modern painting of St. Athanasius the persecuted Bishop of Alexandria, and another of the Virgin, Joseph, and the Child, both of which are pretty good, and apparently of the Italian school. The screen divides the choir from the transept. In the aisles and naves of all the chapels ostrich eggs are suspended; this is nothing less than an old Egyptian superstition, for as the ostrich watches her eggs till they are hatched, and never leaves them, the eggs were adopted

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* Gibbon, vol. vi., p. 241.

† The brothers keep up the remembrance of the friendly intercourse which existed between their patrons by paying each other a ceremonious visit once every year.

‡ The present year is only the 1539th of the Coptic era, which begins from the persecution of Diocletian, called the Era of Martyrs, i. e. reckoning from the 29th of August, A.D. 284.

as the emblems of watchfulness. The number of the monks, by their own account, is sixty-three, though this, I think, exceeds the truth, unless they count their absent brothers. They informed us, that two hundred and fifty years ago, the convent was repaired and re-inhabited, after having been left without an inmate for seventy years, owing to the monks introducing within their walls a number of boy slaves, who, in course of time, growing up, and demanding permission to marry, on refusal rebelled and murdered their masters. They have two delightful gardens, abounding in fruit, principally dates; their olive-trees bear a very large fruit, some of which they preserve; they have also the caroub, or locust-tree,* apricot, vine, &c.; nor are they deficient in vegetables. The gardens are well irrigated by channels of running water; and there are cisterns capable of affording a plentiful supply for many months, in the event of the Arabs † cutting off the communication with the sources, which are outside the walls.

I believe they have some books, but they were very unwilling to show us even their worn-out bibles, which they said were all they had. This is the conduct of all monks in the East, though it is well known that in some of the convents are to be found rare and valuable manuscripts. Deïr Antonios is interesting as having been the place of abode and sepulture of the founder of monachism. The mountains at the foot, or rather on the edge of which this monastery is built, are calcareous; they also contain much salt.

March 12.—From St. Anthony we crossed the Wâdy Arabah, in the direction of Deïr Ebkhéit, or Bekhéit, about N.E. by N. Having heard that near that spot were some old copper-mines, we resolved on visiting them, in preference to the watering-place itself, where we understood there was nothing but a few palms,‡ and not even any remains of a convent; though I have no doubt, from the name, that the place was once the abode of monks, as well as many others § in these mountains, which bear the same prefix. Besides Deïr Bekhéit there are two other watering-places ||

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* Ceratonia Siliqua.

† The name of Arabs properly and exclusively belongs to the natives of either desert, and is equivalent to Bédoui, or Beddowee. Those settled on the Nile are called felláhs or labourers, whatever their origin may be, and never claim the title of Arab. The inhabitants of Cairo style themselves 'Ebni Bélet,'—Sons of the Town, or Townspeople.

‡ I never saw or heard of any palms but near water; though in many vallies of the primitive mountains there are innumerable seyále, tamarisk, and other trees, the palm we never found but at the watering-places themselves.

§ As, Deïr Bouerát, Deïr Abouderráje, &c.; this last they said was a kuffri gadeem, or old ruin.

|| The Arabs also brought us water from a spot called Hórrheh, I believe a little to the E. or S.E. of the copper mines, but it was too much impregnated with sul-

in this part of the North Kalálla, at El Abbéia and El Khúllul; the water is there preserved after the rains in natural basins in the rock, as is generally the case in these mountains, where springs are very rare. The rainy season does not consist of more than five, ten, or twenty days, nor, from what the Arabs assured me, is it ever known to rain thirty days during the winter.

After a short day's journey of little more than twenty-one miles, we reached the low hills in which are situated the copper-mines of Réigatameréeh;—they have evidently been worked by the ancients, as well from the quantity of pottery and scoriæ there, as from the remains of the miners' houses, and the regular manner in which the caverns have been cut, following up the veins. Our arrival was welcomed by a gazelle, which some of the Sheïkhs * had shot. Fortunately for us, we soon had reason to find the accounts given in a modern publication of the horrors of this desert not a little exaggerated. So far from its being for the most part destitute of every trace of animals and vegetation,—so far from its being the Avernus of the winged tribe, and a mere parched sand abandoned by all reptiles but the ant, we had the pleasure of seeing, every now and then, gazelles and taytals† browsing under the shadow of the seyále,‡ or brought in by the Arab chasseur;—vultures and kites soaring above us; and, at evening, were visited by a strolling party of scorpions, and a wandering snake. Mr. Granger, too, is wrong in stating that the partridge is only found in the neighbourhood of the convents of St. Antony and St. Paul; we always met with grouse and partridges in great abundance at the different watering-places, but particularly at Howashéea, and the others in the primitive mountains in the south. As to the ruins of Alabastron being still visible to the north of Mount Kalil, and nearly in the same parallel with Oxyrhynchus, this will appear evident to every one, who examines the relative positions of these places, to be impossible, though those ruins may exist somewhere or other in these mountains.

Our next trip was to the sea. This part of the Arabian Gulph is called Mérse,§ (مرسي) Zaffarána, from the neighbouring moun-

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phur to be drinkable or wholesome. Khohr signifies a channel or bed of a torrent. The other watering-places between Dehr Bekheit and Suez are:

1. Melheh; salt water, as its name implies; 2. malaga or hours.
2. El Geséib.
3. Abouderráje, from twelve to fifteen miles from the sea.
4. Gwayb or gwebb, bitter water containing salts.
5. Alle-dthayb, in the Wady Roonáyby, bad-smelling water, beneath the sand.
6. Athwáyrig; 2 malaga from the former, bad water.
7. Ros Attága, near Suez,—rain water, but not a sufficient supply for one year.

* Pronounced Sháykh.

† Capra ibex.

‡ Acacia Seyal.

§ It is worthy of remark that Mérse means a beach or anchoring place, also an

tain, that joins and indeed may be considered as forming part of the Southern Kalálla. The shore is very flat, and the damp vapour which rises from the marshy soil must be exceedingly hurtful, and even dangerous in the hot season. One extremity of this bay, which is the termination of the Wády Arabah, is formed by the point of Abou Derráje, the other by that of Zaffarána. The small headlands, on the southern side, are a breccia rock of a late formation, composed of stones, shells, and other matter, connected by a calcareous cement. Among them were some very fine conchs,* which I in vain attempted to detach from the rock. One of our Arabs here discovered, in the sand, a quantity of beads, stained glass, one or two European bullets, and cloth,—marking the burying-place, no doubt, of some Europeans.

From this place the caravan set off for Deïr Bólos, by the short road, which lies between the upper and lower Zaffarána mountains; while the dromedaries followed that between the latter and the sea, crossing the point of the same name. In an hour and a half we came in a line with this long tongue of land, which runs out to a great distance, considerably increased by the shoal at its extremity; and beyond it we passed a small rocky headland, called E'Selymát Béeud. We met with nothing interesting along this flat shore till we arrived at the low hills of Wady Girfe, which lie between Gebel Kólzim and the sea. Here we observed, on the summits of several of them, the remains of old houses; the walls, consisting, as usual, of stones placed on each other without cement, have, for the most part, fallen in, but the masonry appears to have been well constructed, and the ruins to be those of an ancient town intermediate between the position of Már Bólos and the sea. The dimensions of the rooms in the ruined houses vary from six paces by three, to eight by eight, or more; and one was upwards of thirty feet long. Amongst the rubbish within them were quantities of broken pottery, fish-bones, shells, &c. Though we found no cisterns, I have no doubt that water, conducted from the sources at the modern convent, was thus preserved here. Near the ruins is a small knoll containing eighteen excavated chambers, besides, perhaps, many others, the entrances of which are no longer visible. We went into those where the doors were the least obstructed by the sand or decayed rock, and found them to be catacombs; they are well cut, and vary from about eighty to twenty-four feet, by five; their height may be from six to eight feet. They are rounded at the upper end, and in many of them, at nearly two

anchor; but this last is written مرسي Mérsé. Zaffarán signifies saffron; but I imagine this name has no relation either to the mountain or the promontory.

* κογχους . . . μεγιστοι δε τυγχανουσιν, ωστε μη ειδοσιν, απιστον αυτοις του μεγεθους την υπερβολην ειναι. Agatharcides de Rubro Mari, p. 29.

feet and a half from that wall, is a partition of hewn stone, stretching across from one side to the other, but not now, if ever, of any height. Some of the chambers are double, communicating by a door. In the largest we found several very fine crystals of salt: the rock is calcareous, and contains a quantity of fossils. We sought in vain for inscriptions or hieroglyphics; our curiosity was only rewarded by finding the scattered fragments of vases, bitumen, charcoal, and cloth. It is evident that the bodies were burnt, and the ashes, after the usual ceremony of bathing and wrapping them in these cloths,* were probably deposited in the vases, of which innumerable broken remains are seen in every direction;—they are earthenware, mostly red, and heart-shaped, with a mouth of about three inches in diameter, terminating at the base in a point; the materials and workmanship are good.

To what people shall we ascribe these ruins?† The Egyptians did not burn their dead;—the other claimants are the Greeks and Romans; and of these the name Grády Rouémi, which the headland just below bears, inclines me in favour of the former, Rouémi or Rúmi signifying Greek.‡ Grády is a plant which abounds on the flat shore below these hills, and nothing is more common among the Arabs than to name their vallies and mountains from plants growing in them. A circuitous road of about seven miles led us to the convent of Deïr Bólos;—it is situated in a more picturesque spot than that of St. Antony, and has a much cleaner and neater appearance, owing to its having been more recently repaired. The streets and houses are also laid out with some degree of regularity and order, though in size it yields considerably to the other. The monks, too, appear cleaner and richer,—are better dressed and lodged, and possess more luxuries;§ in this alone, however, superior to the brothers of the other convent; being uncouth and even inhospitable,—ignorant, and consequently suspicious, and scarcely condescending to answer the usual questions of the traveller.|| Their garden, though small, abounds in fruit-trees, as pomegranates, apricots, prickly pears, olives, figs, the nebek, and abundance of dates. It is supplied with water from the sources without the wall, which they preserve in cisterns. A new piece

* The cloth is found only in small pieces, and is very different from that in the mummy pits of the Egyptians.

† Will not this agree with the position of Ptolemy's Clysma?

‡ Greek, in Arabic, is Yunáni. The Arabs borrowed the name Rúmi from the Greeks of Byzantium.

§ They spread us carpets on a large Cairo mat; and the coffee, scented with cloves, was brought in handsome cups on silver stands. Pipes, too, of no inferior quality, were given us,—nor do they or the brothers of St. Antony consider it any crime to smoke within their walls. Pococke, vol. i. c. 6. That traveller has given a sketch (Pl. li.) of these two convents, which he describes in bk. ii. c. 7.—Ed.

|| [Mr. Wilkinson was not, perhaps, aware that this reserve and silence are required by the rules of their order.]

of ground was added six years ago; but as it was higher than their reservoirs, they would not take the trouble of raising the water, or adopt any plan for the cultivation of what must have required some labour and expense to inclose.

In their churches* there are some pictures,—one of St. Mark and another of St. Athanasius, (which seem to be of the Italian school,) are the only two of any merit; the rest are grotesque representations of saints, dragons, miracles, and madonnas painted on board, by artists of Alexandria. There is a chapel dedicated to St. Mercurius, below which is a subterranean one, reputed the oldest part of the convent;—the lower part of it is cut out of the rock, and an apartment therein is shown, as the residence and place of prayer of their devout founder. The walls are adorned with stiff old frescos. St. Paul, they told us, was a nobleman of Alexandria, and a most dissipated and abandoned character; but, repenting of his sins and warned by repeated visions, he changed his wicked course of life, became pious, and bidding adieu to the vanities of the world, at length founded, in the neighbourhood of the retreat of his friend St. Antony, the convent which still bears his name. He is generally said to have been the first who led a hermit's life; but the venerable Antony was both monk and hermit—(μοναχὸς καὶ ἐρημίτης).

The monks reckon 1539 years since the establishment of the monastery, which agrees very well with the time in which St. Antony flourished; nor is it believed, that the catacombs of Wády Girfe were ever inhabited by the disciples of their patron before the convent was built. Formerly, the monks were much more numerous than they are at present, each room containing four or more persons,—their discipline was more strict, and penance frequently was insisted on by the superior, on the commission of trifling faults;—it was performed in the excavations above mentioned, which were continually kept free from the sand, which has since been washed into them by the rain. They admit that the catacombs were much older than even their subterranean chapel. Their number now consists of eighteen lay members and three brothers;† the former may become brothers if considered deserving of this promotion: the choice depends on the Coptic patriarch of Cairo.

They informed us that there is a road across the mountains to Deïr Antonios, practicable for camels as well as asses, and much nearer

* In both convents they have bells;—their sound was new to us in Egypt. I never heard of any at Cairo but those of the Roman Catholic and Coptic convents, but these are very small, and within the chapels. Vansleb says that St. Antony is the only convent in this country with a bell; and Pococke makes the same observation with regard to it and that of St. Paul.

† These last answer to our resident fellows of colleges, the former rank with under-graduates and servitors.

than the usual one taken by the Arabs, being but one short day's journey. They also told us, that during the wars, which, before the present Pasha had established order throughout the Arab tribes, existed between the Maázy and Abábde, these last often advanced as far as the convent, alternately repulsing and being repulsed by their adversaries. They added that the Abábde were very superior in behaviour to the Maázy; who were never known to express any thanks for the many necessaries given them, independent of their food; while the former, on the contrary, when provisions were let down to them, always returned thanks by kissing the rope, and immediately left their walls, without offering any insult, or in any way molesting them. But, the fact is, that the Abábde were in a foreign land; this desert, and the rock on which the convent is built, belonged to the Maázy: who only tolerated it because it was convenient to them to have the means of obtaining provisions in that part of the mountain. At present, thanks to Mohammed Ali, the monks have no longer any fears from the aggression of any tribe.* The Abábde are now much more powerful and numerous than the Maázy, and some of them have moved northwards into this desert, beyond Gebel Dokhán, with their families and flocks; but they seem a very quiet people, and have more simplicity of manners than their northern neighbours; their arms are chiefly spears, long knives, swords, and some guns, with these last, however, the Maázy being much better furnished. They have long bushy hair like the Nubians, which forms a most distinctive mark between the two tribes, the others wearing the cap and turban.

The monks are Ichthyophagi, and go down in small parties to the sea, where a two days' fishing suffices to load a donkey, which they keep within their walls; rice, lentils, and bread, are their principal, if not their only other food.

A few hundred yards to the north of the monastery is an insulated rock, through the upper part of which a hole, three or four inches in diameter, perfectly straight, has been perforated, but for what purpose, by whom, or by what instrument, it is impossible to say. There are many fossils in these mountains.

The Arabs, during our stay here, had a grand festival; a camel was killed, which had been bought by public subscription before their departure from the Nile, part of it was eaten † on this occasion, and the rest dried in the sun.

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* The Maázy and northern Abábde may be considered successors of the Ichthyophagi,—the southern Abábde and Bisharéeh of the Troglodytes; though, in fact, the former were only a branch of Troglodytes, as we learn from Agatharcides.

† I am surprised that Pococke should say the Arabs do not eat the flesh of this animal. Vol. ii., c. ix.

From Deïr Bólos we made an excursion to the sea, in the direction of Grády Rouémy. After a ride of three hours (about nine miles) we came to the beach, which we continued to follow in hopes of finding some port corresponding to the ruined village, but in vain. We only met with a wall of weed, sand, and fish-bones, raised in form of a crescent to keep off the north and east winds;—it was probably the lodging place of the monks of Deïr Bólos. A quantity of broken spars, bamboo, and cocoa-nuts, the remains of some vessel from India;* the skeletons of some unfortunate sailors, washed high upon the beach; a flat barren shore without trees, or herbage, save that which delights to grow near the Salt Sea; shallow water scarcely covering the sharp rocks,† which would be the inevitable destruction of any vessel driven upon them; such are the objects which present themselves on this coast. Several flights of titlarks passed us on their passage northwards. We found some dried fish,‡ very singular in form, but had neither time nor means to procure any alive.

Soon after our return to the convent we bade adieu to the last human habitation we were to meet with in these mountains, and set off for Gebel Tenásep; in two hours and three-quarters we reached some hills containing ammonites. In about three hours more we came in a line with the primitive mountains § on our left, while the calcareous range of Kolzim still lay on our right. Here we found, for the first time, a tree called Toúthop: || it bears a pink flower, with six long stamina, one pistil, and three petals. Its berry is red, bitter, and not eatable.

* We found a piece of painted wood belonging to the stern of a vessel,—certainly of Indian workmanship. I believe this is the spot where the Calcutta transport was wrecked, in 1802.

† Conf. the Periplus of the Erythrean Sea: καθολου μεν ουν ουτος ο της Αραβικης χωρας ηπειρου παραπλους εστιν δυσορμος και ακαθαρτος, ραχιαις και σπιλοις απροσιτος, και κατα παντα φοβερα· διο και εισπλεοντων μεσον πλουν κατεχομεν. The greater part of these frightful rocks are coral, which are supposed to have given the name of Red to this sea.

‡ Agatharcides, mentioning the mode of catching fish practised by the Ichthyophagi, says, that when the tide had left the fish among the rocks and shallow holes, they went down and seized them, though often not without some difficulty and even danger. He includes the σκορπιοι among those which were to be dreaded, by which he probably means crabs; and true indeed it is, that they will not only defend themselves, but even attack a person in the water, if at all molested by him, which happened to me at Myos Hormos. The dogfish, a species of shark, 'canis,' is also very common here.

§ The mountains on this side of the Arabian Gulph are calcareous, grit, granite, traprock, porphyry, &c. with some breccias: none hereabouts are volcanic, but there is a range of those mountains on the Arabian side of the sea, extending into Syria; by which several cities formerly, as well as in later times, have suffered, either from their eruptions or the subterraneous convulsions of volcanic matter.

|| Though the Arabs have no P in their language, yet it is often used in the pronunciation of their names of plants, towns, &c.; I have therefore introduced it here.

A short distance beyond is Wady Dth*á*hal, at the end of which is a spring of good water bearing the same name. We passed some rocks of micaceous schist approaching to gneiss, and a little farther on the junction of the primitive and grit-stone, from which we descended to the Wady Ghrásheca. Here we found some scratches on the rocks, and two or three Greek words and names.

About eight miles farther is Gebel Tenásep. The Arabs here brought us a táytal or bouquetin. The meat of this animal is not unlike mutton, but is much inferior to the gazelle; it is the ibex of Linnæus. The female differs very widely in form from the male; she is much smaller, and at a short distance it is almost impossible to distinguish her from a gazelle; her horns are short and nearly straight, but her forehead is broader than that of the gazelle, which is also made more slightly in the legs. The dogs caught a jackal during our stay near Tenásep—it was very small, with the ears and brush disproportionately long.

We now bade adieu to the secondary mountains, which diverge to the south and south-west, gradually lessening in height.

At Gebel Howasheea is a plentiful supply of excellent water; it is preserved after the rains in a natural basin in the granite, filled with small pebbles washed into it from the crumbling rock; these being removed, the water is found at a very small distance from the surface. We saw many partridges and grouse* here.

About two hours to the northward is a small copper-mine, which must have required great labour to work it when gunpowder was unknown, the rock being hard granite. There are the remains of three old huts, and it may have been by the miners † that the words above mentioned were cut on the rocks, at the watering-place to which they must have resorted. About three hours from this copper-mine, and the same distance from the water of Howasheea, is another watering-place, called E'resays elli fi sayl el Howasheea, or Ereys el Howasheea: the water is good, but in a very small quantity; and the basin in which it is contained is so small, that the camels can scarcely drink from it: such was the report of the Arabs.

April 10*th*.—Thermometer 93° Fahrenheit, at mid-day; on the 3rd it was at 45° in the night. I think the average difference be-

* Perdix Katá, or Damascena, in Arabic, gúttur or kútta, a bird which the Arabs say knows the spot it leaves so well that it will fly from the greatest height to the very place of its abode without the least previous search; whence their proverb, 'yáraf el mówde' áhder min el katá,'—'he knows (such and such) a place better than the grouse.'

† Near the water of Dara were marks on the rocks of similar forms.

tween the heat of the day and night in this country may be considered about 30°.

Having left Howasheca, we went by a short road over the mountains to Wâdy Abouhadth, where we awaited the arrival of the camels. This valley contains much herbage and a few trees, but principally the seyále; they told us the gum of this tree would be gathered in two more months, and that it was preferable to that of the sont. The inner rind of its bark, like that of the yessur (a species of broom), is used for tanning. We started several quails, but all single birds.

April 13*th.*—This day, a warm wind, thermometer 91° at midday. In the evening we reached Gebel Hem-t-elabd,* and early next day the majestic Ghrárib.† The water of this last mountain, which is excellent, is preserved in a large natural basin in the granite, capable of containing a supply for several years in case of no rain falling;‡ there are many other similar, though smaller reservoirs, which the torrents have formed; most of them are now dry, but two or three still contain water. In the large basin there is now a distance of ten feet between the surface of the water and the highest water mark. It is probable that in the vallies of the primitive mountains, below the sand, or rather decayed particles of the rock, which the torrents have brought down, there must be in places similar reservoirs of water in the granite, which, being compact, could retain it for a great length of time when not exposed to evaporation. I cannot otherwise account for the quantity of trees, the luxuriant appearance of their foliage, and the greenness of the herbage, which in the vallies of the secondary mountains are always parched up, or, at best, display but little signs of life.

During our stay here we ascended the mountain, which, from its steepness, and the frequent occurrence of ravines, is rather a fatiguing undertaking. The first evening we reached the base of the highest cone, where we slept, and ascended the next morning to the summit, from which we had a view of the mountains on either side of the sea and the different plains. We tracked the gazelles very nearly to the summit, and every now and then in the ravines found some solitary plants growing under the shade of a projecting stone. The peaks of this mountain resemble the Aiguilles near Mont Blanc; but to equal that mountain in beauty, it requires the lower parts to be covered with

* Properly Themil-t-el Abd,—'the fount of the slave.'

† I will not pretend to decide whether this name is derived from, or bears any relation to, Hor, Horeth, Horeb, or the Horebites, (mentioned by a modern author as that of the country of the Troglodytes;) it signifies in Arabic 'the setter,' (of the sun,) from ghrarb, the west, probably because the mountain conceals the sun from the eastern side of the desert long before sunset.

‡ Burckhardt, p. 10. 'On the Rainy Season.'

the woods and verdure of the Alps, and the desert plain below to be exchanged for the green meadows of Switzerland. I calculate the height to be 5513 feet above the ravine in the plain below, which is a few hundred feet above the level of the sea. We found a most striking difference between the heat below and that on the mountain. The thermometer in the valley had been 80° at sunrise, 95° at 9 A.M., and upwards of 100° at mid-day, a day or two previous to our ascent; but we found that at sunrise on the mountain (and that too not the highest part) it was 46°, and one hour afterwards the water in the zemzemayeh * had not reached 40°.

May 1*st.*—Thermometer, sunrise, 70°, at mid-day 93°; wind N.W. The khamsín had now begun; but we did not feel any bad effects from it during the whole of our journey in the mountains; the winds were now and then hot, but not so oppressive as on the Nile, where a great quantity of fine sand is always raised, which obscures the whole atmosphere. It has been erroneously supposed that the S.W. is the hottest and most prevalent wind during this season; one of the worst khamsín storms I ever saw was accompanied by wind from a northern quarter, another was from the S.S.E.; and I know that the wind this year, as well as last, prevailed from the N. and N.W. during the months of May and June.

Four hours south of Ghrárib is the watering-place of Gebel Dára. Here we found some ruined huts of miners, who had evidently, from the furnaces and copper scoriæ, smelted the ore in this spot. The huts are about seventeen in number, in one of them, much longer than the rest, were some burnt bricks, belonging perhaps to a furnace; but the two principal furnaces, which are of considerable size, lie a little lower down, on the side of the ravine, where there is a considerable quantity of scoriæ. The walls of these houses or rooms are four, five, and six feet high; and some I should think were nearly of their original height: they are made of stones piled on each other, and cemented together with moistened sand and gravel; the doors are about four feet high, and formed by a long flat stone laid transversely from wall to wall. We found a granite block hollowed out for a mill, which I should think intended for grinding the broken ore rather than corn. There are some marks of a road to the water, which has since been destroyed by the torrent, in the bed of which it lay. The supply, if not more ample than is now found, must have been but little for the number of people employed here, but they may have sent for whatever more was required from Ghárib.

We next visited the copper-mines, which are about eight miles

* A bottle made of Russia leather.

to the southward, in a spot without either wood or water: on which account, probably, the ore was sent to Gebel Dára to be melted down. The rock at the latter place was worked only in one spot, where a shaft was sunk, about five feet and a half in diameter, and not now more than twenty-five feet deep. It contains but little copper, and the ore is very inferior to that of the principal mines.

The low hills in which these mines are situated have been all tried in search of ore, but in few are the excavations of any size. It would seem that these larger were the work of some government, while the smaller, which are confined to the surface, may have been the later attempts of individuals. We found no remains of huts. While encamped here, several flights of birds passed over, most probably migrating to the colder climes after the winter, as they all went in a northerly direction. Some were of the hern species, others the merops and oriolus, and of the hawk kind, &c.

May 5th.—Hot wind S.E. by S. Thermometer 101° Fahrenheit, at 11 A.M. The night was very stormy, and rain fell in the mountains to the north-west of us. The thermometer was 80°, and next morning at sunrise 78°.

On our way to Gebel Dokhán by the plain, we passed some calcareous rocks, and then a line of sandstone,* with limestone over it, which ran parallel to, and at nearly an equal distance between, the two primitive ridges. The trees were all bent down to the south, from the great prevalence of the north-east winds. This is the case in Egypt, wherever single trees are much exposed.

May 6th.—Hot wind S.E. Thermometer 103° Fahrenheit, at 11 A.M., and each hot gust raising it immediately to 107°. At some distance to the east, we observed the site of a watering-place called El Enned.† It stands at the base of some limestone hills, which join the eastern primitive ridge.

We soon after reached Gebel Koóffra, where there is water. It is too salt to be drinkable, except by camels. Some of the Arabs, however, knew of other water, higher up in this mountain, but were not certain that it was sweet. Having gone to ascertain this point, they brought us some which was excellent. We were in great want of it, having already sent to Moie Mesayd, but in vain, all being dried up there. I imagine that the water of

* Judging from the angle of its dip, it formerly rose over the lower or eastern primitive range, from which, however, it is now separated by a valley, or bed of a torrent.

† The Wady Enned contains some hundred palms, and abundance of tamarisk trees. A small stream, running down the slight descent of the valley, forms a rivulet of the clearest water, which loses itself in the sand; but though the traveller might look on this as an unusually pleasant spot, his admiration would cease, when he learnt that the stream, which enlivens the scenery, is neither useful to himself nor his camels.

Koóffra, which is fresh at the mountain, becomes impregnated with salt afterwards, on its way to the spot where the Arabs water their camels.

At Gebel Dokhán, we had the satisfaction of seeing ruins* of some extent; of viewing those vast quarries,† from which Rome took so many superb pieces of porphyry to adorn her baths and porticos; of contemplating the labour and expense incurred in making so many fine roads, which cross the mountains in all directions; of walking in the streets and houses of the old inhabitants of an ancient town; and, above all, of finding a temple in the midst of a now deserted and uninhabitable valley.

The chief difficulty in working these quarries was the want of water. It was removed by sinking two wells, one of which must have cost immense labour, being a shaft of about fifteen feet in diameter, sunk in a solid porphyry rock;—it is now impossible to judge of its depth, being much filled up with earth, but there is still some distance to the spring;—the actual depth of that part where it is solid rock is thirty-eight feet, and much more must be allowed for a good supply of water. It has a cistern attached to it, from which are led troughs for the cattle. The other well is more filled up, being altogether only twenty-two feet deep, with a diameter of fifteen feet;—that part which is still visible is cased with stone. It is placed on one side of a circular space, which was perhaps once covered in, by means of a roof supported on pillars, five of which still remain. On them are scratched boats and various figures, also a few Greek letters above a cross. This last is near the town which the Arabs call Bélet Kebeer, or the large village; the other is a ten minutes' walk distant, and in another valley.

The town was situated on a small height, at the base of the eastern mountain, and contained many houses of various forms and dimensions. At the north end is a square, around which seem to have been shops, where they worked small porphyry mortars, judging from the number of unfinished ones we found in them. In another long apartment, are some round holes in the earth, cased with terra cotta, apparently for the purpose of washing some mineral, though I see no other marks of anything having been wrought here but porphyry. A house, perhaps that of the præfect, consists of an area, on each side of which are four pillars, which perhaps once supported a covering; beyond is a stuccoed cistern, and then a room, from which staircases lead to the upper story, at least to those rooms which are above, for the town is built on a declivity. The whole is surrounded by a wall, strengthened with

* Mr. Burton, in 1822, was the first traveller who visited these interesting remains.

† Pliny well describes their vast size, by observing—'Quantislibet molibus cædendis sufficiunt lapidicinæ.'—Lib. xxxvi. c. vii.

towers placed according to the nature of the ground. I consider the whole as a military station, containing workshops, storehouses, and every thing which the place might require. On the outside of the wall, to the south, is a separate building, either a furnace or a bath, more probably the latter.

Besides this town there are houses built on either side, at the base of the mountain, or upon the adjacent low hills, which were perhaps habitations of workmen. A little farther up the valley, to the south, is a small temple dedicated to Sarapis;—it was never finished, though all the materials are on the spot; not a column was ever put up,—nothing was completed but the step on which they were to stand, and which was to form the base of the portico. The order is Ionic, the mouldings very simple, and the architecture superior to anything one could have expected to find in these mountains. In the area, which was paved with rude flat stones, stands an altar without inscription; it is three feet two inches high, and was once stuccoed. All the architectural part of the temple is of red granite: the inner part, which may be said to consist of an adytum and two wings, is of the usual piled stones, like the houses of the station, and was once stuccoed. The whole was inclosed by a wall, at the north end of which was the door way, at the top of a flight of steps, which are placed at one side, instead of the front, evidently in order to avoid the torrent. On the architrave is the following inscription, of the time of Hadrian: the sigma has the ancient form of Σ, while the Ω is formed thus: ω.

> *Ὑπὲρ σωτηρίας καὶ αἰωνίου νίκης αὐτοκράτορος Καίσαρος Τραϊανοῦ Ἀδριανοῦ σεβαστοῦ καὶ τοῦ παντὸς αὐτοῦ οἴκου. Διὶ Ἡλίῳ μεγάλῳ Σαράπιδι καὶ τοῖς συννάοις θεοῖς, τὸν ναὸν καὶ τὰ περὶ τὸν ναὸν, Ἐπαφρόδιτος Καίσαρος Σιγηριανὸς ἐπὶ Ῥαμμίῳ Μαρτιάλι ἐπάρχῳ Αἰγύπτου, Μάρκου Οὐλπίου Χρησίμου ἐπιτροπεύοντος τῶν μετάλλων ἐπὶ Ρ. Προκουληϊανοῦ.**

Sarapis, the god to whom the temple is dedicated, seems to have been a favourite deity among the miners, since to him alone are dedicated altars and temples in the two principal mountains of Dokhán and Fateere, from which the Romans took their porphyry and granite.

This god, who is of Pontine, and not Egyptian, extraction, was introduced into Egypt in the reign of the first Ptolemy, and confounded, by the ingenuity of the priests, with the husband of Isis, who was then the most popular deity in Egypt; nor does it seem that the Egyptians, if they ever worshipped him at all,

* [This and the other inscriptions are in fac-simile in the MS. of Mr. Wilkinson, that is to say they are in capitals with the words undivided, as usual in Greek inscriptions.]

considered him in any way different from Osiris, except inasmuch as he was, according to Plutarch, 'the mere union of Osiris and Apis,' 'Apis being a beautiful image of the soul of that god.'* The Greeks, however, paid him a peculiar and distinct worship; he has been identified with Pluto, Apis, Æsculapius, and Osiris. His votaries were principally foreigners, or those who made their religious tenets subservient to the wishes of their monarch; for, says Macrobius, the oppression of the Ptolemies could never prevail on the Egyptians to worship this god in other parts of the country with the same forms and ceremonies as practised in Alexandria, because they did not accord with those in use for their other gods.†

He was frequently worshipped in company with Isis, who is found mentioned together with him in the dedication of his temples, and often, indeed, with her name first; which precedency of the female sex was an *old* Egyptian custom, as we learn from Diodorus.

A little farther up the valley, and on the opposite side, is a small ruin, consisting of a walled area, from which leads a flight of steps to a platform, uniting it to an adytum, which is nearly square,—a colonnade leading up the centre supported the roof, on each side of which was a raised bench;—near it, in the bed of a torrent, was a round block, on the circumference of which are the remains of an inscription, recording a dedication to Isis (written Ειϭειδι), by a military officer of the name of Phanius Severus, in the twenty-second year of the reign of Adrian. As that emperor reigned a month less than twenty-one years, he appears to have been dead at the time of the dedication, though the knowledge of his death had not yet reached this distant station.

A great quantity of pottery is found in every direction among the ruins, particularly a blue and glazed species, probably used for domestic purposes. There is also much glass and fish-shells, the latter of which are probably the remains of one of the chief articles of food of the ancient inhabitants. They communicated with the sea by a high road leading from the S.E. side of these mountains, of which I shall afterwards have occasion to speak. The roads on the eastern side of the valley are not so wide, neither are the quarries so extensive as on the western mountain; the roads are not, however, unworthy of remark: constructed with the same attention, they fully answer the purpose for which they were intended, though the skill of the engineer was not so much called for.

In the quarries there is nothing remarkable but the remains of a few furnaces for repairing and tempering the tools; for, it is

* Plutarch de Is. and Os., c. xxviii. xxix.
† Macrobius, lib. i., c. 4.

evident, from the quantity of small chippings of porphyry, that the large blocks were chiseled, and, probably, nearly finished on the mountain. There were several small huts, and others, on the summit of the hill, for these seem to have been watch-towers, perhaps as look-outs, on the different heights; in one of these huts, a stone, which formed part of the wall, is inscribed with the name Socrates.

The western mountain presents more to interest the traveller. At the base of it is a small village, in which was worked the porphyry that was sent down by the superb road, which terminates here. The larger blocks were cut into sarcophagi, or baths, and tazze, in a court without the houses, which were themselves very small; many of the blocks are still in the position in which the workmen left them. The road which leads from this village up the mountain is fourteen paces broad: at the distance of about every twelve paces are piles of stones. Innumerable smaller roads diverge from it, in various directions, to the different quarries.

On the principal road are buttresses, or solid piles of stone, raised at intervals, probably for lowering the larger blocks; and in some parts we observed inclined descents, paved with great care, which must have been for the same purpose. It is probable that the column, or other kind of wrought stone, was placed on a sledge (similar to that represented in the grottoes of Massara), which was gently lowered by means of cranes attached to the buttresses.

The road, cut into the sides of the rock, is built over the beds of the smaller torrents, winds round the precipices of the larger ones, and is supported wherever the rock was not solid, by a well-built wall. From one of the quarries the stones had been thrown down over the road below, from which they had afterwards been cleared, either by carrying them away or by rolling them down to the ravine beneath: beyond this was a large quarry, in which we found an unfinished porphyry* column; its dimensions were twenty feet two inches long, by three feet six inches diameter. This, as well as several bases of columns higher up the mountain, sufficiently prove that large blocks were worked nine hundred or a thousand feet above the plain; nor was this without its advantage in a stone of so heavy a nature, particularly as the workmen were not deficient either in number or skill, and that, consequently, the risk of lowering the blocks was but trifling, when compared with the benefit arising from lessening their weight. Many of the

* All these quarries are of red porphyry, and of a most beautiful kind;—it that close-grained stone, so much of which is found, and still admired, amidst the ruins and magnificence of ancient and modern Rome. It has been thus described, 'lapides porphyretici tenuibus astris distincti;' and Pliny calls it 'leucostictos,' observing that it is interspersed with white spots—'candidis intervenientibus punctis.'

blocks were raised on stones, that they might be more easily accessible to the workmen.

Some marks on the blocks seem to indicate the number of stones cut by each workman; and that the men who worked here were condemned* to complete a certain quantity of work, according to the offence for which they were sentenced; for nothing can induce me to think that any men but those who were condemned to this labour, would ever endure the heat and oppressive toil of cutting blocks from a porphyry quarry in a climate like this, unsheltered, as they must have been, from the scorching rays of a summer sun. Those who were employed in the valley, or lived in the town, had a better lot. It appears, from an inscription at Gertassy, in Nubia, that the workmen drew forth a certain number of stones, after which they were probably exempt from labour, unless condemned for life, as was sometimes their lot. The writer of that inscription, after having finished his task, very naturally performed his vow to the tutelary goddess of the quarries for his deliverance.

Continuing to ascend the mountain, we met with the base of a column three feet nine inches in diameter; and, beyond it, came to a steep inclined plane, similar to that on the eastern mountain. On the point of this height was a watch-tower, which though at some distance from the summit of the mountain, seems to shew the termination of the works here. In the valley, or ravine, to the N.W. of these quarries, is another village, but apparently of a later date than the Bélet Kebeer; the walls of the houses are in good preservation, and the doorways and windows are still entire. It is built on either side of the bed of a torrent, whose course was confined within the walls which protected the houses from its force, and served as their foundations. On one side is a cistern, from which the water was admitted to the torrent by a small channel, leading obliquely from it; on the other is a large house, probably belonging to the commandant, at one end of which a flight of steps led to a terrace above. There were several mortars cut out of rough blocks, which had evidently been used on the spot, with the remains of furnaces, and much of the blue and other pottery. On ascending the western mountain, it struck me that the works there were of a posterior date to those on the eastern side of the valley, and the appearance of the village confirmed my opinion; indeed, after the time of Adrian, much porphyry was carried to and used at Rome; and the greater importance of this mountain may account for the unfinished state in which the temple

* I since find that Aristides, Orat. Ægypt. Oper., vol. iii., in speaking of this mountain says, that to these celebrated porphyry quarries were taken those malefactors who were condemned to the public works; and Eusebius tells us that Christians were also sent thither.

of Adrian, in the other valley, was left. A little lower down this valley are other houses, in one of which we found a broken bath, and a tazza, which had merely received its shape.

Gebel Dokhân, 'the mountain of smoke,' is, perhaps, an old traditional name by which the people of this desert designated the spot when numerous furnaces continually smoked here; its Latin name was porphyrites mons.

It was long a matter of doubt* where the famous porphyry quarries were situated, though so often mentioned by ancient writers: some went so far as to question whether Egypt produced this stone at all, because the quarries happened not to be on the Nile, and because Egyptian statues were rarely made of this material;—it was supposed to have come from Arabia, and the 'rubet porphyrites in eâdem Ægypto' of Pliny was not sufficiently convincing. But Ptolemy proves that the quarries were in the mountains which extend southward from the calcareous ridge of Troicus †, on the western side of the Arabian Gulf.

In the time of Claudius ‡ statues of porphyry were first taken to Rome by Triarius Pollio; but we do not learn that any quarries were then worked, or that the mountain from which the stone came was yet known to the Romans. It is probable, however, that the Egyptians, or Greco-Egyptians, wrought them long before the time of Claudius, though we find no proofs of this fact on the spot.

The objects for which the porphyry was used by the Greeks and Romans were principally baths, columns, tazze, statues, and for ornamenting their houses: we may also add, for making mortars, though I do not think the pyrrhopœcilum which Pliny says was in great request for that purpose, and which came from the Thebaïs, was porphyry, but rather syenite. For statues porphyry was but ill suited from its hardness and colour, nor does it appear that they were ever much admired at Rome; but this stone served often for the drapery, while the heads, arms, and legs were of white marble. The lower age revived the bad taste of porphyry statues, and many are still in existence.

Over the mountain, which closes the southern end of the valley of Béiet Kebeer, runs a zigzag road, on the top of which is a watch-

* But if the existence of the porphyry quarries in Egypt was doubted, what has not been said of the gold-mines of Osymandyas? This has been stated to be a direct falsehood, and merely intended to deceive the Greeks; the gold-mines of Diodorus, Agatharcides, and Sherif Edrísi, however, are still found among the Ababde mountains, to the south of the Cosséïr road.

† Universale litorale latus juxta Arabicum Sinum tenent Arabes Ægyptii, Ichthyophagi, in quibus dorsa montium sunt, Troici lapidis montis, et alabastreni montis, et porphyriti montis, et nigri lapidis, et basaniti lapidis.—Ptol. Geog. lib. iv., c. 5.

‡ Statuas ex eo Cl. Cæsari procurator ejus in Urbem ex Ægypto advexit Triarius Pollio, non admodum probatâ novitate.—Plin. lib. xxxvi., c. 7.

tower; the passage seems to have been closed, when necessary, by a gate. Below, on the other side, is another small building; and beyond, in this valley, towards the S.E., is a *station* of some size;* it consists of two forts, one merely a thick wall, which runs round a granite rock, with a doorway defended by two towers; there are no remains of houses within, and there is scarcely more than room, in some places, for a man to pass between the wall and the rock. The other is the kind of fort usual in these stations, supplied with what I suppose to have been a well, and with convenient houses or rooms; it is fortified with towers; those at the entrance had a staircase leading up to the top; on the outside is a walled inclosure, containing large apartments, probably intended to receive the stones as they passed from Dokhân, the merchandise from Myos Hormos, the beasts of burden, and the men who accompanied them; while the fort would be set apart for the soldiers or permanent residents, who had the superintendence of the necessary supply of water always kept at these places, or were here posted to give additional assistance, if required, to those who passed, and to repair the roads. From this station a superb road led through the plain and over the beds of torrents, which run between these mountains during the rainy season. It was, in some parts, forty-eight or fifty feet wide; along the sides were placed stones which had been cleared from it, and afterwards served to mark its limits; at intervals were larger heaps, and on the heights, at the side, piers of stones, regularly built to serve as road-marks; which last, being out of the reach of the torrents, are generally in good preservation. But, in most places, there are no other vestiges of a road, which, having been exposed for ages to the force of those water-courses, has at length been swept away. It must have cost great labour to keep it in repair; but hands were numerous, and it would only happen every five or six years that the torrents would descend with so much force as materially to injure the road. I attempted in vain to make an estimate of the inhabitants of the villages and houses at Dokhân and Fetecreh; there must have been many thousands, besides a great number who always lived at the works on the mountains; indeed, if we calculate only the inmates of these different stations, and of Myos Hormos, we shall find a considerable population in this desert, where we now but rarely meet a few wandering Arabs with their flocks. At the above-mentioned station (which may be called the last on the Coptic road) the roads from Myos Hormos and Coptos unite with two from the valley of Dokhân, namely, that of the Bélet Kebeer, which crosses the southern extremity of that valley, and another which passes by Dehr Amyessur, and thence among the

* There is another village on the east of Gebel Dokhân, in the valley at the skirts of the mountain, which I did not see.

skirts of the mountains, taking in its way the other small village, which I did not visit. This last road is followed by the camels on their way to Guttár, the other is only passable for unladen dromedaries; there is another short way to Guttár between Gebel Dokhán and Thúndebug, by which dromedaries can easily pass, but it does not appear to have been used by the ancients. Before Gebel Guttár, at the N. or N.W. extremity of the El Memfáyah chain, is a watering-place, called Moie-t-el-abd, or, 'the water of the slave; but in so small a quantity is the water, that it only suffices to fill one skin at a time. Not far from Guttár, between it and Gebel Thúndebug, we met with some Breccia verde; of other kinds of Breccia we had observed great quantities and varieties at Dokhán.

The beautiful valley which leads to the water of Guttár, is filled with fine seyáles, which at this time were particularly green, in spite of the want of rain; on continuing farther up the valley gradually diminishes in breadth, and presents the rugged appearance of a mountain torrent's bed, filled with large stones, till it terminates in a precipitous rock, overgrown with hanging water-weeds, down which the water drops slowly; below are palm-trees and rushes, and a basin which affords a plentiful supply of excellent water on digging a hole in the gravel of decayed granite, with which it is filled. There are innumerable figures scratched upon the rocks on the road to the water, and among them is an old tomb, probably Christian. I ascended the rock, and crossing the ravine above, in which were some smaller natural reservoirs, arrived at a stone building, which, from its appearance, is not very ancient: it consists of three rooms, and a kind of portico, or covering, supported on two pillars; nothing but the roof is wanting—the walls, windows, and door ways being all perfect. The Arab shiekh, my guide, at length pointed out a 'written stone,' which proved to be a Greek inscription, showing the building to have been a church. It lies on the ground, on the outside, and is broken, but few of the letters, I believe, are lost. The words are as follows:—

Φλαύιος Ιούλιος ὁ διασημότατος ἡγεμὼν Θηβαΐδος ὁ κατασκευάσας . . . . καθολικὴν ἐκκλησίαν. Ἐπὶ . . . ητος ἐπισκόπου Μαξιμιανοπόλ(εως).

During our stay at Guttár the gazelles were so much pressed for water, that they ran through our encampment in the valley, and having satisfied their thirst returned the same way, for it was the only road to the watering-place, and these animals always prefer the valleys to crossing the mountains, unless in those parts where they have beaten tracks. This is even the case when closely pressed by dogs; and I have known them return and pass their pursuers when they found that the valley was nearly at an end. During our stay here some Abábde brought in some kepsh

(or mountain skeep), several taytals, and a hare. We observed, also, in our way to Guttár, and near the water, many partridges and grouse, some of which we saw also near the ruins.

From Guttár I set off to the sea to visit the ruins of Myos Hormos, which my friend, Mr. Burton, had discovered in a visit last year to the mountains on the coast. Myos Hormos is nothing more than one of the usual stations, except that it is laid out with a greater regularity of plan; it consists chiefly of magazines for depositing the merchandise, which was thence transported on camels by a commodious road to Coptos. This road, which as I before observed, joins those of Dokhán at the last-mentioned station, runs from that station to the sea in a perfectly straight line, (except where the angle of the mountains, near the sea, gives it a slight bend). It is very easily traced by the large piles of stones placed at intervals on either side; and some places still exist where the smaller stones are seen cleared off and ranged along the sides. Mr. Burton observed other roads higher up, which must also have led to Myos Hormos.

This station, so famous as the emporium of Arabian and Indian merchandise, from whence one hundred and twenty vessels sailed to India,* has not now a single inhabitant, except such as the animal whose name it bore. Its outer walls were defended by towers, built of limestone from the neighbouring mountains; the other parts were constructed of rude stones, of various kinds, cemented together. The bases of the houses were of similar materials, on which was raised a superstructure of crude brick, which has since entirely disappeared owing to the rains and moisture of the sea air. The situation is a flat marshy plain, so low that I should even think the sea must occasionally cover the whole, except the ruins, which stand on ground rather more elevated, probably an artificial mound. No place can be more unhealthy; † during the summer months the atmosphere is charged with damp vapour, exceedingly oppressive, and resembling that of a Turkish bath. In the time of the prosperity of Myos Hormos, many were, doubtless, the victims of its unwholesome air.

The port is a small bay, which runs inland at some little distance on the northern side of the station; here the ships could ride at anchor, protected from the violence of the sea, and could quietly

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* According to Gibbon they sailed at the winter solstice, and their return was fixed to the months of December and January; 'the principal objects,' he adds, 'of Oriental traffic were splendid and trifling; silk,—a pound of which was estimated not inferior in point of value to a pound of gold,—precious stones, and a variety of aromatics.'

† Though I remained there but one entire night, I returned to Guttár with an acute dysentery. A traveller intending to visit this place, ought not to be later than the month of May, nor earlier than October, and even then he should take bark as a preventive. But the whole of this coast is unhealthy, and, I believe, on both sides of the Gulf.

discharge their cargoes, which might either be deposited within the walls, or immediately transported on camels to the Nile. The accumulation of sand continually driven into the bay, has rendered it now so shallow, that no vessel could float in it even at high tide; the same must happen to the port of Cosseir, or any other on this shore (Pliny assures us there were once many on this side of the sea), if they are neglected; the water, however, in this bay being deeper than on any other part of the coast, and on one side there seems to be a sort of channel, where the principal current runs on the ebb and flow of the tide. On the southern side projects a point of land which, at high water, becomes an island, and appears to have rendered the entrance to the port circuitous.* We found no remains of cisterns or wells. As to the Fons Tadnos, we must look for it in the low ridge of mountains about three or four miles off;—a watering-place still exists there; but the water is salt, though drinkable by camels. 'Mox deserta ad Myos Hormon,' says Pliny: and with reason may this be said of the whole coast for miles. To the south the eye wanders over a plain on which is neither herb nor tree, except the bushy safsaf † close to the water's edge; one spot on the coast is resorted to as being entirely covered with salt, which the Arabs, as well as sailors of the Red Sea, collect; it is nearly opposite the Saffâgi or Jaffatine Isles. To the S.W. the place is bordered by the El Memfáyah chain of primitive mountains, which are at a considerable distance from the sea; on the W. and N.W. a low ridge of calcareous hills (uniting with a similar primitive range, a little to the north) approaches within four miles of the sea; and in the distance on the north is seen the mountain of Ez-zeït, so called from the quantity of petroleum found there; whence project two small headlands, forming two gulfs, at the entrance of which are many long sand-banks. May not this be the 'Mons Eos of Pliny, or the ὄρος ἐν πεδίῳ μιλτῶδες' of Strabo and Agatharcides?

Strabo describes three islands in front of Myos Hormos, two of which (he says) were thickly shaded with olive-trees, the third much less so, but full of meleagrides. The Saffági are not exactly facing the port; but the large island of Shadwan lies directly in front of it, and may perhaps be the 'insula Lambe' of Pliny. Possibly the olive mentioned by Strabo may have been the safsáf, for there is a great resemblance between the two trees; and I have no doubt that much oil could be extracted from the berry of the safsáf, which is small and green. The Arabs use the wood in making charcoal for gunpowder; their proportions are one kantár of charcoal, half a kantár of saltpetre, and of sulphur one rottle, or the one hundred and fiftieth part of a kantár. The tree grows in the sea, or close to the water's edge. It is a bushy evergreen,

* [Εἶτα Μυὸς ὅρμον . . . . λιμένα μέγαν, τὸν εἴσπλουν ἔχοντα σκολιόν. Strabo, p. 769.]
† Elæagnus.

sometimes rising to the height of ten or twelve feet, nor do I remember having ever seen it with a single trunk.

In spite of indisposition I could not bid adieu to these mountains without visiting the ruins of Fateereh. A circuitous road led us behind the ridge of E'Memfáyah to the watering-place of Sheïb-el-benát; on the way we passed that of Gezzá, where there is salt-water; the valley which extends from it abounds in seyále trees; twenty-five minutes' trot beyond this is another, called Moie-t-Uksáyar, but as the water only remains there for one year after the rains, it was now dry. We observed several piers of stones marking an old road in this direction; some distance beyond is Am-kohleh,* where there was still a supply of good water; and about two hours farther is Sheïb-el-benát, where there was also a little water still remaining. This spot is so called from being the place of concealment of two Arab girls, who ran away from their parents, and were discovered here.

May 29.—Thermometer at sun-rise, 66° Fahrenheit, it was more commonly 68° at the same hour. We again met with piles of stones, and among them one which had been the burial-place of an Arab of the Maazy tribe, who was here killed by a party of Abábde; the offenders, according to the accounts of our Arabs, (who were Maazy,) had reason to repent of their crime, for no sooner was it known, than a large party of his companions set off for the deserts of the Abábde, and cut off eighty of the aggressors, whom they murdered, as a retaliation for the death of their friend. Many wonderful feats were told of this man, who, it seems, was no ordinary character either in his exploits or appearance: it was said that his look always struck terror into his enemies, and that he could tie his mustachios together behind his head. Such are the usual tales which these Arabs relate of former days. But as the scenes of action generally lie in the Maazy Desert, it would appear that they were always the weaker tribe, as they would certainly be found to be in the event of a renewal of hostilities. Indeed the Abábde seem, from the incursion which gave rise to the retaliation, to have advanced to the very extremity of this desert, and to have carried off booty without resistance.

Gebel Kabreet (the Mountain of Sulphur) lies to the W. or S.W. of Howasheea; and five miles beyond it, in a plain, is a spot called Moggat-el-Hallát, or the station of the Cowards, from the following circumstance: some Abábde had carried many camels and booty belonging to the Maazy from Gebel Máksary,†

* The kóhhel is used by the women, and even sometimes by the men, to colour the edges of their eye-lids. There are four or five different kinds, all consisting chiefly of antimony, and all used for the same purpose. Perhaps the mountain may have received its name from containing antimony.

† Perhaps Gebel Mássara, for the Arabs of the desert never pronounce a name properly.

a mountain somewhere between Cairo and Suez, and retired with them to this spot, where a party of Maazy surprised them, retook the spoils, and put upwards of forty of them to death.

Near the tomb of the Arab is a watering-place, called after him, Moie Rooayshid;* but the supply here also was now exhausted; a road leads up the ravine to it, and being marked by large heaps of stones,† is probably ancient. We soon afterwards descended to a large plain, on the opposite side of which was Gebel Fateereh.

At the eastern end of the plain ‡ another road leads to the watering-place of Amooné Másser; from its name, so much unlike those of modern origin, we hoped to find some remains, but were disappointed. The water which is preserved in a natural bason in the granite rock is excellent.

Having passed behind the ridge of Fateereh, we arrived at last at a small village containing twenty or thirty ruined huts. Thence taking an E.S.E. direction up another valley, we arrived at the ruins of a few houses, and some large unfinished columns lying on the ground; they were of the same kind of grey granite, found in all the quarries of this mountain; the two largest being twenty-nine feet eleven inches long, by three feet four inches in diameter, and the others twenty feet three inches long, by three feet two inches in diameter. There were also the bases of more in different directions, on one of which we discovered some letters; and having cleared away the earth which nearly buried it, we found a Greek inscription, containing the name of Ennius Priscus, a chiliarch (tribune) of the twenty-second legion.

Soon after leaving this spot we reached a very large *station*, which seems to be the ancient Ὕδρευμα Τραϊανοῦ; it consists of a large fort of the usual kind, capable of containing a great number of men, defended by towers, and provided with several cisterns. On one side a considerable addition has been made, but we looked in vain for any inscription which could enable us to ascertain the time of this enlargement.

On the outside of it is another walled inclosure, containing two long rooms, intended, probably, for lodging cattle or for granaries, beyond which is a well. Outside the walls is a raised side-pave-

* A corruption of the original name Ráshid. If a person demands of another what road he is to take to any place, and the other tells him a good and safe way, his director is called Ráshid, because (yoorshid ile tareek) 'he shows him the good road;' he who goes by that road according to his directions is called moorshed; in this sense, therefore, Ráshid signifies 'a good guide.'

† The modern Arabs are contented with forming their road-marks with two or three stones, or sometimes by placing a single one on a rock in some conspicuous part of a ravine.

‡ To the S.S.W. of the descent of this plain is another watering-place called Gebel Euchdt. The water was dried up.

ment, probably used only during the rainy season; and eastward of the fort are baths and the house of the præfect; the former are all, with one exception, vapour baths, and arched, as was the custom, the light being admitted from the top, from which was suspended a chain to regulate the heat of the room.* At the end of the centre room is a niche. The hypocausts are very perfect, as well as the pavement over them, and the flues at the sides of the walls still remain. Adjoining the vapour baths (sudatoria) is the warm bath, where we found but one small reservoir, built of stone and coated with stucco.

Behind the baths is a round temple, to which a broad road leads from the fort. At the top of a large flight of steps in the front, stood an altar of grey granite, (now broken in pieces,) on one side of which was the following inscription:—

'Anno XII. Imp(erante) Traïano Cæsare Aug(usto) Germanico Dacico, per Sulpicium Simium præfectum Æg(ypti).'

In the area around lie capitals and bases † of unfinished columns; none of the shafts had yet been brought here, though two of the bases are in their proper positions on the step or foundation of the portico, over which, no doubt, four Corinthian columns, with an architrave, frize, and pediment were to have been raised. But of these component parts of the temple the only member that appears to have been ready for erection is an architrave, which lies just below the area, and bears a dedicatory inscription, of which the following is a copy:—

Ὑπὲρ σωτηρίας καὶ αἰωνίου νίκης αὐτοκράτορος Καίσαρος Τραϊανοῦ Ἀδριανοῦ σεβαστοῦ καὶ τοῦ σύμπαντος αὐτοῦ οἴκου καὶ τῆς ὑπ' αὐτοῦ ἐπιταγέντων ἔργων ἐπιτυχίας. Διῒ Ἡλίῳ μεγάλῳ Σαράπιδι καὶ τοῖς συννάοις θεοῖς τὸν ναὸν καὶ τὰ ἐπὶ τὸν ναὸν πάντα, Ἐπαφρόδιτος δοῦλος Σειγηριανὸς, μισθωτὴς τῶν μετάλλων, κατεσκεύασεν ἐπὶ Ραμμίῳ Μαρτιάλι ἐπάρχῳ Αἰγύπτου· ἐπιτρόπου τῶν μετάλλων Χρησίμου Σεβαστοῦ ἀπελευθέρου ὄντος πρὸς τοῖς τοῦ Κλαυδιανοῦ ἔργοις, Αουίτου χιλιάρχου σπείρης πρώτης Φλαουίας Κιλίκων ἱππικῆς. B. (Ἔτει δευτέρῳ) αὐτοκράτορος Καίσαρος Τραϊανοῦ Ἀδριανοῦ, φαρμούθη κη (28).

Having passed the intended portico, three doors lead into a

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* Vitruvius, lib. v., c. x. 'Mediumque lumen in hemisphærio relinquatur, ex eoque clypeum æneum catenis pendeat, per cujus reductiones et demissiones perficietur sudationis temperatura.'

† In one or two of these bases the block forms also part of the lower end of the shaft, which is here two feet one inch and a half in diameter. The capital is one foot seven inches and a half in diameter, and the same in height.

chamber, in which either stood, or were to have stood, columns and pilasters; in the centre is a fallen altar, on which, after having cleared from it the rubbish which nearly buried it, we found the following inscription:—

> Annius Rufus Leg XV Apollinaris præpositus ab optimo Traiano operi marmorum Monte Claudiano v(otum) s(olvit) l(ibenti) a(nimo).

The altar, which was nearly square, had never been finished, except on the inscribed side.

On the right-hand side, entering the chamber, is another apartment, with a niche, behind which is a double wall, and, in the intermediate space, just room enough for a man to stand conveniently. Another chamber facing this apartment has also a secret passage behind the wall; and between two staircases leading from the area there is a singular round closet supported on the walls. There is nothing else remarkable in this building except numerous niches in various parts of the walls, and, in one place, a sun and asps, of Roman workmanship. The chambers have been vaulted and stuccoed, so that the portico alone seems to have remained to be added, when the works of Mons Claudianus were abandoned. This name was probably derived from some præfect in the reign of Trajan, not from the Emperor Claudius, as in that case the name would have been Mons Claudius. I am inclined to think that these quarries were only worked during the reigns of Trajan and Adrian.

In the *town* the houses are filled with broken cups and vases, and on some were a few Greek letters and devices of various kinds. Near the gate-way (on the inside) was an altar, which we had some trouble in digging out of the ground, and which proved, to our great disappointment, to be without an inscription;—near it was a stone hollowed out in form of a patera.

In one of the houses, we found what I suppose to have been the stand of a table; in others, mortars; and near one was a large rude block of granite, hollowed out as if for water; in another was an unfinished sphinx of hard slate, (the black stone of Ptolemy,) and near it a very neat little altar inscribed to Sarapis. The upper part is hollowed out in form of a trough or oblong basin, two inches and a half deep, and two inches and five-eighths broad at the bottom. It is of the grey granite of the quarries, like the large one before the temple. In one of the streets is a block of granite with the word Κραμϐυς on it.

We found very few shells, but a great quantity of glass, some of which was very prettily cut; and two small bottles of thick green glass, which I suppose to have been inkstands. We also met with some small pateræ of terra cotta near the temple.

To the N.W. of the baths and temple are quarries, where I observed large blocks with these marks on them, PD XXXII, PD XXXIIII, PD XbIIII, perhaps the initials of the workman, and the number of stones he had cut. Near them is a rock, under the shadow of which are two stuccoed tanks, intended, probably, to be filled for the use of those who worked in this quarry, as is still the custom among the fellâhs hired to excavate the antiquities in the valley of the Nile. In the upper workings was a round block, ten feet one inch and a half in diameter, with a projecting part on one side, making an addition of another foot; its height was three feet; and it had the form of a rough capital. Near it was another of similar dimensions. In this quarry was also a stuccoed cistern; and, indeed, all of them were furnished with small tanks or with cisterns formed in the rock, or built of stone and afterwards stuccoed. The quarries are very extensive, and there are several convenient roads leading through them, though not so numerous and well-formed as those of Gebel Dokhân. In the quarries, as well as in the valley below, we observed many large blocks, apparently intended for capitals; one of these was a round block ten feet two inches in diameter, and four feet two inches in height;—beyond it is a column, eight feet in diameter and twenty feet long, besides what is buried in the ground. Close to it is another of equal size but more covered. Mr. Burton saw two columns fifty-nine feet three inches in length and eight feet six inches in diameter, quite finished, except that one or two projecting pieces of the stone, like the trunnions of a gun, and intended for fastening cords to remove the columns, still remained; the others had been broken by some accident, and some of the pieces had been cut up for other purposes. Another column lies in the plain, the shaft of which is twenty-six feet seven inches and a half long, and each fillet one foot; the fillet at the base is four feet two inches in diameter. Near it is a round block, perhaps intended for a capital, eight feet seven inches in diameter, and four feet four inches high; another six feet six inches in diameter, and four feet six inches in height; another nine feet one inch and a half in diameter, and four feet four inches and a half high; another block lies on one of the roads, which lead to the quarries on the hill, seventeen feet long, and about eight feet in diameter; it was once much longer, but was broken in its descent; other pieces of ten feet and a half in length, and some longer;—some smaller lie near it, no doubt parts of the same.* Many of the large blocks are raised on small stones, whereby their positions were easily

* At Sheikh Seïd, a little south of the ruins of Antinoe, on the Nile, I found a block,—intended, apparently, for a capital,—which was fourteen feet in diameter, and six feet nine inches in height; but this was of calcareous stone, whereas those at Fateereh are of hard granite.

varied according to the pleasure of the workmen. They stand generally on platforms, a little elevated above the plain or the road, from which they were, when finished, easily lowered upon sledges or rollers. I took drawings of two of them thus placed, which were eight and a half feet in diameter. The building for which these large columns were intended could be of no ordinary dimensions, for the column, including base and capital, could not have been less than sixty-eight feet; adding to this an architrave, frize, and cornice of seventeen feet, the height will be increased to eighty-five feet without the pediment.

The columns, when prepared, were to be dragged to the Nile, if directly, to Coptos, upwards of sixty miles; but if by the road of Dokhân, which, from the great convenience of the stations on it was more probably the route, the distance was considerably greater. It is hardly possible that a column could arrive at Rome from these quarries in less than a year.

At some little distance to the west of the town, or fort, is a long room, the roof of which was once supported on pillars built of stones; it was intended, perhaps, as a stable for the beasts of burden. Continuing a little lower down this valley, we turned to our left into another, along which ran the old road to Cosseir. We soon reached the first station, which is built on either side of a small mountain-torrent's bed. On one side, on an elevated mound, stands a fortress or fortified town, defended with towers, attached to which is a room containing a large cistern;—there is another smaller one without the wall, close to which are two troughs for the use of the camels and other animals. In none of these forts have I ever seen more than one gateway, except at Myos Hormos; nor can they be considered as regular Roman hybernacula or permanent military stations, but merely as fortresses or fortified towns. Beyond this we observed the usual road marks, constructed with great care on the heights. The distance from hence to Kosseir, according to the Arabs, is as follows:—

From Fateere to Kreimouséef	1½ day, or, in fact, only 13 or 14 hours;—there is water and an old station.	
„ to Ankéil	1½ day;—water.	
„ to Ambagi	0	5 hours;—water.
„ to Kosséir	0	2 hours.
Days	3	7 hours.

But this distance is, as usual, greatly exaggerated; the whole journey from Guttár to Kosseir might be performed in three days with ease, from Guttár to Fateere being a very short day. After Ankéil is Gebel Seega, where there are said to be ruins in the

mountains, and several old roads leading across the Wady of the same name, which extends, I believe, to the sea; I do not conceive that the distance from Ankéil to Kosseir is, in reality, more than eighteen or twenty miles, making about four dromedary hours.

After our return to Guttár I took leave of Mr. Burton, and set off for Kéneh, by the old road from Dokhán to Coptos. In the Wady Guttár, where the road crosses the valley, is a small station, where I observed a trough that probably belonged to a cistern, destroyed by the torrent, which has carried away the eastern wall of the station, and almost every vestige of the buildings usually found outside these forts. The direction of the road is still discernible from the piers of stones built on the heights or on the road side. Three hours and a half's trot brought us to the third station, where we observed, for the first time, one of those large wells, described by Strabo: it occupies about a quarter of the fort, and once, no doubt, afforded a plentiful supply of water. On the decrease of this supply was probably sunk a small well, which is seen at the side, and has the appearance of a later date; from it ran a channel to a cistern, but the greater part of it is now destroyed. The outer walls of this place are built of the usual rude stones, cemented together, the towers are of crude brick; those on the sides of the door way, as usual, had staircases, and contained an upper room, on each side of which was an arched window; the others seem to have been built only to strengthen the walls, and are rather buttresses than towers. The walls of the houses are of crude brick, raised on a foundation of stone: the roofs were apparently vaulted; one of these still remains. Near the well is a tower of crude brick, which may have been intended for raising water. On the northern side is an inclosure, which received, perhaps, the passing loads, and lodged the men and camels. On the south-east corner are troughs which were filled from the cistern, out of which the water was probably raised by poles and buckets, or baskets, as is still the custom among the felláhs of Egypt.

We had now left the high mountain of E'Memfáyah far to our left; and our road continued amidst the low skirts of the primitive chain, which we at length quitted, and entered a large plain, on one side bounded by the primitive, and on the other by the secondary, mountains, which extend to the Nile; before us lay other secondary hills, to which we directed our course. The breadth of the plain, in the broadest part, that is, from the western secondary to the higher primitive chain, is about forty miles. The former of these ridges is called, in these parts, Gebel Abouselébbe, so called, according to the Arabs, because it contains good water, preserved in a basin in the rock, which is so deep that they are obliged to use a 'selébbe,' or rope, to raise it. Opposite

and to the south-east of this, rises another small mountain, called Eggeer, also secondary; it is between these two that the plain terminates, or, at least, becomes narrower. At the extremity of some low hills, which form the eastern and south-eastern skirts of Gebel Abousélébbe, stands the second station, on the road from Keneh to Dokhân, called by the Arabs 'sâghee,' or 'the water-wheel,' no doubt from large wells still remaining, from which the water was probably raised by wheels. One of the wells is of an unusual size, and sunk in the rock, but has been partly filled up with decayed walls, rubbish, and earth, washed into it by the rains; at its brink are troughs, a cistern, and a paved channel for the rain water to run into it from the court or inclosed space in which it stands. This is surrounded on three sides by an artificial mound, the gateway of which is built of hewn stone. On the west side stands the fort, and to the north of it is another well, below which is the inclosure which contained the magazines or lodging rooms.

Finding ourselves much pressed for water, owing to the badness of our skins, we dispatched, at half past nine A.M., two light camels to the Nile, with orders to return, as soon as possible, and to meet us on the road.

In the cool of the evening of June 9th, we set off for the first station, called by the Arabs Old Keneh, which we reached in four hours and a half, at a slow pace. One hour short of it we passed the ruins of four or five houses, close to two road marks; they are remains perhaps of some diversorium. Old Keneh is an ancient station, situated at the base of a small hill, on the point of which stands another fort. The upper contains no houses, but the lower is divided into rooms as usual, and has the usual inclosure annexed to its walls for magazines or lodging-houses. Without are troughs and a small cistern. Nothing can be more absurd than the name given by the Arabs to these ruins, which were a station on an ancient road leading to Keneh, and were distant from the real Cœne or old Keneh, which was near the modern town, at least thirty-five miles. A well-wooded valley runs from this to the large, open, and herbless plain of Keneh.

We set off next morning, June 10th, at a little before six, and at half past eight met the water camels on their return from the Nile. Not trusting entirely to skins, we had provided a few bottles of water, which still remaining untouched, would have been a sufficient supply till our arrival at Keneh, but our dromedaries had not tasted a drop of water for three days, which, at this season of the year, and during a continued journey, is much more to them than double that space of time in winter. At the latter end of April, they once passed six days without drinking, and were so little distressed, that they travelled twenty-five miles to the water

without being fatigued. We now gave each of them half a large skin, or about forty pints, which, though but a small quantity for a thirsty camel, was sufficient to recover them from their fatigue.

We left the old Coptos road, and continued in a direction nearly south to the palm-trees of Keneh, where, after so long an abode in the desert, everything appeared new and agreeable. Ripe water-melons were in abundance, and an universal verdure surrounded us; but nothing was so striking as the profusion and negligence with which water seemed to be lavished, an article which we had been in the habit of guarding as the most precious of our provisions. The Nile had already begun to rise, and promised another rich harvest, which it only requires a more energetic people, and a better government, to render doubly profitable.

III.—*Extract of a Letter from Mr. Alexander Loudon to W. T. Money, Esq.* Dated 24th May, 1831, on his passage to Europe from Java. Communicated by Mr. Barrow, and read 28th November, 1831.

'In July last, when returning from a visit to my brother-in-law, Mr. Valek, in the interior of Java, I examined, in company with several others, the *Guevo Upas*, or Valley of Poison, perhaps the most extraordinary place in the world; and as a description of it may not be uninteresting, I enclose the following copy of a letter which I have this day written to Dr. Horsefield, the botanist, who was many years in Java.

' "In the publications of the Batavia Society of Arts and Sciences, I have often read with pleasure your travels and experiments, and particularly that on the Pohu Upas, at Barjowargée, (where I was resident in 1811,) as well as your Tour, published by the same Society, in the eighth volume of their Transactions. Whilst at Batur, you state (p. 24), 'The Guevo Upas is dreaded by the natives, and, according to their account, resembles the Grotta del Cane, near Naples: but they could not be prevailed on to conduct me to this opening.'

' "The object of this letter is to acquaint you that, on the 4th July last, I visited the valley in question, on my return from a tour through the districts of Bagálun, Barjownas, and Ledok. I should be happy to have an opinion upon such a phenomenon of nature. As you have examined the mineralogical constitution of the range of mountains, I know no person so capable of giving an opinion on the Valley of Death as yourself. The following is an extract from my journal on the subject.

' "*Batur, 3rd July*, 1830.—This morning, while walking about the village with the Pattv, (native chief,) he told me that

there is a valley only three miles from Batur, which no person could approach without forfeiting his life, and that the skeletons of human beings, and all sorts of birds and beasts, covered the bottom of the valley. I mentioned this to the commandant and Mr. Spracomberg, and proposed our going to see it; and the assistant resident, Mr. Daendels, agreed to go with us early next morning. At this time I did not credit all that the Javanese chief told me;—I knew that there was a lake on the top of one of the hills, which it was dangerous to approach too near, but I had never heard of this valley of death.—Very cold this morning; the thermometer 52°.'

' "*Batur, 4th July*.—Early this morning we made an excursion to the extraordinary valley, called by the natives Guevo Upas, or Valley of Poison; it is three miles from Batur on the road to the Djung. Mr. Daendels had ordered a footpath to be made from the main road to the valley. We took with us two dogs and some fowls, to make experiments. On arriving at the foot of the mountain we left our horses, and scrambled up the side of a hill, full a quarter of a mile, holding on by the extended roots and branches of trees, and we were a good deal fatigued before we got up, the path being very steep and slippery from the heavy rains during the night. When within a few yards of the valley, we experienced a strong nauseous, sickening, and suffocating smell; but, on coming close to the edge, this smell ceased. We were now lost in astonishment at the awful scene below us;—the valley was about half a mile in circumference,—oval, the depth from thirty to thirty-five feet, the bottom quite flat, no vegetation, a few large (in appearance) river stones, and the whole covered with the skeletons of human beings, tigers, pigs, deer, peacocks, and a great variety of birds and beasts;—we could not perceive any vapour or opening in the ground, which appeared to be of a hard sandy substance. The sides of the valley, from the top to the bottom, were covered with vegetation, trees, shrubs, &c. It was now proposed by one of the party to enter the valley; but, at the spot where we were, this was difficult, at least for me, as a false step would have been fatal, and no assistance could be given. We lighted our cigars, and, with the assistance of a bamboo, we descended to within eighteen feet of the bottom; here we did not experience any difficulty in breathing, but a sickening nauseous smell. A dog was now fastened to the end of a bamboo eighteen feet long, and sent in;—we had our watches in our hands, and in fourteen seconds he fell on his back; he did not move his limbs or look round, but continued to breathe eighteen minutes. We then sent in another, or rather he got loose from the bamboo, and walked in to where the other dog was lying; he then stood quite still, and in ten seconds fell on his face and never moved his limbs afterwards, though he continued to

breathe for seven minutes. We then tried a fowl, which died in a minute and a half;—we threw in another which died before touching the ground. During these experiments we experienced a heavy shower of rain, but were too much interested by the awful scene before us to regard it. On the opposite side of the valley is a large stone, near which is the skeleton of a human being, who must have perished on his back with his right arm under his head;—from being exposed to the weather, the bones were bleached as white as ivory. I was anxious to get this skeleton; but I soon found that any attempt to get at it would have been madness. After remaining two hours in this valley of death we began to retrace our steps, but found some difficulty in getting up; from the late heavy shower the sides of the valley had become slippery; and had it not been for two Javanese behind me, I certainly must have fallen some distance below;—being rather heavy, I held on by the branch of a tree, when my foot slipped and the branch gave way. On reaching our rendezvous we had some brandy and water, and left this most extraordinary valley,—came down the slippery footpath sometimes on our hams and hands, to the main road, mounted our horses, and returned to Batur.

' " The human skeletons are supposed to have been rebels who had been pursued from the main road and had taken refuge in the difficult valleys. And a wanderer cannot know his danger till he is in the valley, and, when once there, he has not the power or presence of mind to return."

' You will perceive from the above extract that there is a great difference between this and the Grotta del Cane, near Naples, where the air is confined to a small aperture, while here the circumference is fully half a mile.

' On my arrival in London I shall be happy to hear your opinion of the mineral constitution of the hills near this extraordinary valley, where there is not the least smell of sulphur, nor any appearance of an eruption ever having taken place near it, although I am aware that the whole range is volcanic, there being two craters at no great distance from the side of the road at the foot of the Djung, which constantly emit smoke.'

[The above communication was at the same time illustrated by the following extract from a letter, written in 1825, by Mr. Hamilton, then British Envoy at the court of Naples, describing the Lago di Amsancto, (*Amsancti Valles* of Virgil,) in the province of Principato Ultra, in the kingdom of Naples. Communicated by that gentleman.]

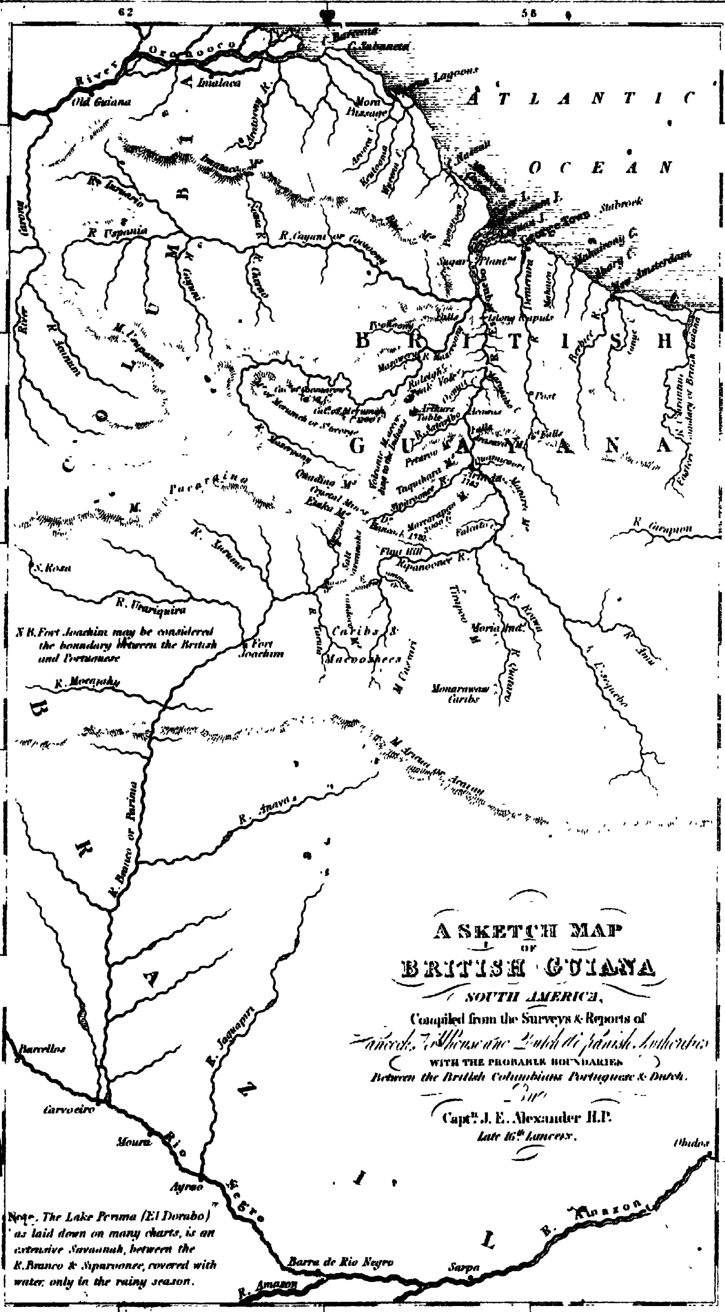
' The next morning (Friday the 17th Oct.), we started at seven from Rocca St. Felice to visit the lake of Amsanctus, about a mile and a half off. The hills here being high up among the mountains, are not

in themselves very elevated, and from the ridge of land close to us descended a variety of rills or winter streams, working their way through the soft and moist earth till they meet in a kind of valley, one side of which is still thickly wooded with a forest of chestnut trees, called Macchia di Rocca St. Felice; and the other would be equally so, but the ground has been cleared, and is now cultivated to within a hundred yards of the foot of the hill. Exactly where the valley begins, we found—(close under a steep shelving bank of decomposed limestone, on which were no signs whatever of vegetation, and on which we found here and there crystals of sulphate of lime, or selenite, impure sulphur, also sulphate of alumina, products of the limestone, &c., acted upon by sulphureous acid gas)—here, I say, we found a lake of a rhomboidal shape, being in its smallest dimension about twenty paces, and not more than thirty in its longest dimension, the water of which continually bubbles up over a large portion of the surface of the lake, with an explosion resembling distant thunder, though not reaching to the height of more than two feet. The water is of a dark ash colour, may be almost called black, which is the effect of its mixture with earth blackened by the effect of the sulphureous acid gas. On one side of the lake is also a constant and rapid stream of the same blackish water rushing into it from under this barren rocky hill, but the fall is not more than a few feet. A little above are apertures in the ground, through which warm blasts of sulphuretted hydrogen gas are continually issuing, with more or less noise, according to the sizes of the openings,—some are oblong, others perfectly round. On the opposite side of this small lake is another smaller pool of water, on the surface of which are continually floating in rapid undulations thick masses of carbonic acid gas, which are visible a hundred yards off. This pool is called the Coccaio, or Cauldron, as having the appearance of being perpetually boiling. The larger lake is called Mephite, and the openings on the slope above are called Mephitinelle: these openings may be imagined to be the *sævi spiracula ditis* of Virgil,—and the Cauldron to be the *specus horrendum* of that poet. (*See Æn.* vii. 563—571.) The mephitic vapours arising from these waters are at times fatal, particularly when they are borne in a high wind in one direction. In calm weather, as was the case while we were there, the danger is much less, as the carbonic acid gas will not, in its natural state, rise more than two or three feet from the ground, so that we could walk all round the lake and Cauldron, and even step over some parts of it; but it was necessary to take care not to slip, so as to fall; as a very short time, with our faces too near the ground, would have sufficed to fix us to the spot. As it was, I had much difficulty in filling a small bottle with the water from the lake, as I was obliged to hold my

head up high while I bent down (the peasants of the neighbourhood endeavouring to alarm us more than necessary by their own fears and ignorance); nor could I stoop low enough to place an insect on the ground, on which I wished to try the experiment how long it could live on it; but we saw the dead bodies of many strewed upon the ground all round the lake. They say birds too sometimes fall down dead either into the lake or on the banks, and strayed sheep are frequently killed by the vapour. A Mr. Santoli, Inspector of Forests, who accompanied us to the spot, and who, as well as a Mr. Brocchi, an Italian chemist, has written upon this natural phenomenon, described to us as the gaseous products of the lake,—1. Carbonic acid gas; 2. Sulphuretted hydrogen gas; 3. Sulphureous acid gas; and, 4. Carbonated hydrogen gas. While Mr. Crawfurd was taking a view of the spot, I endeavoured to sit under the lee of a large stone among the decomposed calcareous rock; but I was soon obliged to quit my position, or rather to quit my neighbourhood to the ground, as I began to experience a disagreeable sensation in my throat, and a difficulty of breathing.

'In the same dip amongst the hills, and about one hundred and fifty yards from the lake, is a small stream of running water, in which, for the space of about ten yards, is a place called "The Vado Mortale," where is also a gurguglio, or bubbling of carbonic acid gas, with a mixture of sulphureous acid gas in the stream itself. The water is here very cold, and not disagreeable, but the earth about is considerably blackened. It is curious enough that there is no appearance of volcanic products in the surrounding country.

'The people in the neighbourhood described to us the noise of the principal lake as much diminished since the opening of the largest of the spiracula, as well as the height to which the bubbles of the water are raised;—of course, in the lapse of many years, many changes are likely to have arisen; but it is curious to observe still so many points of resemblance with the concise description of Virgil, though much must be allowed to the imagination of the poet. Some changes have been effected of late years by an attempt, which has failed, to establish a manufactory of sulphur close by, like that in the Solfaterra, to which we may attribute the disappearance of all remains of a temple (said by Pliny to have existed on the spot) to the Dea Mephitis. There have also been some disputes between the peasantry of the neighbourhood and the lord of the soil, in consequence of their having discovered that the deposit of the water of the greater lake, being a sulphate of alumine, was a cure for the *scab* or *rot* among their sheep and cattle. In order to get a quantity of it, they dug pits close to the lake to draw the water off and let it evaporate; and when the proprietor wished to make a profit of it for himself, they opened a ditch to let the whole off at once; but Nature would not be so outwitted,



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J & C Walker Sculpt.

and she continues to afford a sufficient supply for all the wants of the villages around; this being connected with another quality of the lake which I have not yet mentioned, namely,—that with a constant current rushing into it, and perhaps a supply from below with the rising gas, there is no apparent exit except when it overflows during the season of the rains. Another change had been effected also by another winter torrent very near the lake, which had destroyed a small lake similar to the great one, called the Frepoli, by carrying away at once the ground around it. About a quarter of a mile from the lake, on the hill above, in the corn-fields, are also two very small pools, from which carbonic acid gas is continually escaping.

I have now told you nearly all we saw or heard at this spot, which is curious in itself, and interesting from having been celebrated by Virgil, and seldom visited by modern travellers. Swinburne was there, but says very little on the subject. Addison (and many others have followed him) thought that Amsactus was near Terni; but the authorities of Cicero, de Div. i. 36, and of Pliny, ii. 93, are quite sufficient to prove that it was in the country of the Hirpini.

The former of these writers says, that the earth at Amsanctus was *mortifera*, and the latter assures us that there was a spot near the temple of Mephitis, *quem qui intravere, moriuntur.*

IV.—*Notes of Two Expeditions up the Essequibo and Mazaroony Rivers in the Years* 1830 *and* 1831. Communicated by Captain J. E. Alexander, H.P., late 16th Lancers, M.R.G.S., &c.

[Captain Alexander, a member of the Royal Geographical Society, already known to the public by his travels in Persia and across the Balkan, having proceeded to Guiana and the West Indies in the spring of 1831, with the view of making a short tour there, and returning by way of New Orleans, the Vale of the Ohio, Canada, and New York, addressed the communication, of which the following is an extract, to the Society in the autumn of the same year. The early portion of it being a general account of George Town, the capital of the colony of Demerara, is omitted as less purely geographical, and likely to come before the public in another shape.]

My purpose was now to proceed up the noble Essequibo river towards the El Dorado of Sir Walter Raleigh, and view the mighty forests of the interior, and the varied and beautiful tribes by which they are inhabited. Our residence on the island of Wakenaam had been truly a tropical one. During the night, the tree frogs, crickets, razor-grinders, reptiles, and insects of every kind, kept up a continued concert. At sunrise, when the flowers unfolded themselves, the humming birds, with the metallic lustre

glittering on their wings, passed rapidly from blossom to blossom. The bright yellow and black mocking-birds flew from their pendant nests, accompanied by their neighbours, the wild bees, which construct their earthen hives on the same tree. The continued rains had driven the snakes from their holes, and on the path were seen the bush-master (conacouchi) unrivalled for its brilliant colours, and the deadly nature of its poison; and the labari equally poisonous, which erects its scales in a frightful manner when irritated. The rattlesnake was also to be met with, and harmless tree snakes of many species. Under the river's bank lay enormous caymen or alligators,—one lately killed measured twenty-two feet. Wild deer and the peccari hog were seen in the glades in the centre of the island; and the jaguar and cougour (the American leopard and lion) occasionally swam over from the main land.

We sailed up the Essequibo for an hundred miles in a small schooner of thirty tons, and occasionally took to canoes or coorials to visit the creeks. We then went up a part of the Mazaroony river, and saw also the unexplored Coioony: these three rivers join their waters about one hundred miles from the mouth of the Essequibo. In sailing or paddling up the stream, the breadth is so great, and the wooded islands so numerous, that it appears as if we navigated a large lake. The Dutch in former times had cotton, indigo, and cocoa estates up the Essequibo, beyond their capital, Kykoveral, on an island at the forks or junction of the three rivers. Now, beyond the islands at the mouth of the Essequibo there are no estates, and the mighty forest has obliterated all traces of former cultivation. Solitude and silence are on either hand, not a vestige of the dwellings of the Hollanders being to be seen; and only occasionally in struggling through the entangled brushwood one stumbles over a marble tombstone brought from the shores of the Zuyderzee.

At every turn of the river we discovered objects of great interest. The dense and nearly impenetrable forest itself occupied our chief attention; magnificent trees, altogether new to us, were anchored to the ground by bush-rope, convolvuli, and parasitical plants of every variety. The flowers of these cause the woods to appear as if hung with garlands. Pre-eminent above the others was the towering and majestic Mora, its trunk spread out into buttresses; on its top would be seen the king of the vultures expanding his immense wings to dry after the dews of night. The very peculiar and romantic cry of the bell-bird, or campanero, would be heard at intervals; it is white, about the size of a pigeon, with a leathery excrescence on its forehead, and the sound which it produces in the lone woods is like that of a convent-bell tolling.

A crash of the reeds and brushwood on the river's bank would

be followed by a tapir, the western elephant, coming down to drink and to roll himself in the mud; and the manati or river-cow would lift its black head and small piercing eye above the water to graze on the leaves of the coridore tree. They are shot from a stage fixed in the water, with branches of their favourite food hanging from it; one of twenty-two cwt. was killed not long ago. High up the river, where the alluvium of the estuary is changed for white sandstone, with occasionally black oxide of manganese, the fish are of delicious flavour; among others, the pacoo, near the Falls or Rapids, which is flat, twenty inches long, and weighs four pounds; it feeds on the seed of the *arum arborescens*, in devouring which the Indians shoot it with their arrows: of similar genus are the cartuback, waboory, and amah.

The most remarkable fish of these rivers are, the *peri* or *omah*, two feet long; its teeth and jaws are so strong, that it cracks the shells of most nuts to feed on their kernels, and is most voracious; the Indians say that it snaps off the breasts of women, and emasculates men. Also the genus *silurus*, the young of which swim in a shoal of one hundred and fifty over the head of the mother, who, on the approach of danger, opens her mouth, and thus saves her progeny; with the *loricaria calicthys*, or *assa*, which constructs a nest on the surface of pools from the blades of grass floating about, and in this deposits its spawn, which is hatched by the sun. In the dry season this remarkable fish has been dug out of the ground, for it burrows in the rains owing to the strength and power of the spine; in the gill-fin and body it is covered with strong plates, and far below the surface finds moisture to keep it alive. The *electric eel* is also an inhabitant of these waters, and has sometimes nearly proved fatal to the strongest swimmer. If sent to England in tubs, the wood and iron act as conductors, and keep the fish in a continued state of exhaustion, causing, eventually, death: an earthenware jar is the vessel in which to keep it in health.

A family of Indians was seen crossing the river in their log canoe, and disappearing under the bushes on the opposite side; my companion * and myself paddled after them, and we landed under some locust trees, and found an Indian settlement. The logies were sheds, open all round, and covered with the leaves of the trooly-palm, some of them twenty-four feet long; and suspended from the bamboo timbers of the roof were hammocks of net-work, in which the men were lazily swinging. One or two of those who were awake were fashioning arrow-heads out of hard wood. The men and children were entirely naked, with the exception of the blue *lap* or cloth for the loins; the women in their blue petticoat and

* Mr. Hillhouse.

braided hair were scraping the root of the cassava tree into a trough of bark; it was then put into a long press of matting, which expresses the poisonous juice; the dry farina is finally baked on an iron plate. The old women were weaving the square coëoo, or *lap* of beads, which they sometimes wear without a petticoat; also armlets and ankle ornaments of beads. Some were fabricating earthen pots, and all the females seemed actively employed *. They offered us a red liquor, called *caseeree*, prepared from the sweet potatoe; also *piwarry*, the intoxicating beverage made by chewing the cassava, and allowing it to ferment. At their *piwarry* feasts the Indians prepare a small canoe full of this liquor, beside which the entertainers and their guests roll together drunk for two or three days. Their helpmates look after them, and keep them from being suffocated with the sand getting into their mouths: but *piwarry* is a harmless liquor, that is to say, it does not produce the disease and baneful effects of spirits, for after a sleep the Indians rise fresh and well, and only occasionally indulge in a debauch of this kind. Fish, which the men had shot with their arrows, and birds, were brought out of the canoe, and barbacoted or smoke-dried on a grating of bamboos over a fire; and we followed an old man with a cutlass to their small fields of cassava, cleared by girdling and burning a part of the forest behind the logies. These Indians were of the Arrawak nation; we afterwards saw Caribs, Accaways, &c.

The rivers and creeks, and the whole of the interior of British Guiana at a distance from the sea, are unknown and unexplored. October and November are the driest months in the year, and the best for expeditions into the interior. I was unable to go as far up the river as I wished, from the great freshes; the rain fell every day, yet I penetrated in all directions as far as I could, and I trust to be able, at some more favourable season, to return to that interesting country. Mr. Hillhouse, late of the Staff Corps, and now a surveyor of Demerara, a young man of great ability and enterprise, went for the first time two hundred and fifty miles up the Mazaroony river with a Mr. Tichmaker; they availed themselves of the dry months, and had a most interesting expedition last October and November. I trust to be enabled to lay full details of their expedition before the Royal Geographical Society ere long, and now subjoin a sketch of it.

The travellers hired a number of Arrowak Indians, and left George Town in a large coorial, or canoe. After passing up the Essequibo, they got into the Mazaroony river, which makes a considerable sweep to the north-west,† and then returns, so as to

* Parrots, dogs, and fly-catchers were domesticated with them.

† See annexed map, which is only given, however, as approaching to the truth, Mr. Hillhouse's materials having been merely inspected, not formally copied by Capt. Alexander.

form a large peninsula, inclosing lofty mountains and considerable creeks; across the narrow isthmus is a journey of only three days, so that the sweep may easily be avoided. The travellers passed several creeks, and saw on the left mountain-ranges of white quartz several thousand feet in height. A magnificent waterfall, seen at a great distance, fell over the face of a rock apparently eleven hundred feet high; white sandstone rocks were succeeded by felspar on the river's banks; then granite and quartz formed the highest ridges. The travellers learned from the Indians, that up the Coomarow creek there were other fine falls; accordingly they left the Mazaroony, and turned up the creek. No white men had ever been seen there before, except, twenty years ago, three Spanish padres, who had lived for a month or two at the mouth of the creek, and persuaded many Indians to accompany them to the missions of the Oroonoco. The banks were as usual shaded with magnificent trees, and there were scattered settlements of Indians, in all about a hundred and fifty people. The water shoaled as they proceeded; in some places it was only one foot deep, and then three; on these occasions the Indians jumped out of the coorial, and dragged it into deep water: the colour of the water was often very peculiar, being a deep chocolate, from the decomposed vegetable matter held in solution in it. At last they came to rapids, running between high rocks. On the left, at some distance, was a noble peak, which Mr. Hillhouse named Raleigh's Peak, for they were in El Dorado—the shining particles of mica in the quartz having been mistaken for precious ore,—hence a region of gold.

They now left the coorial, and proceeded towards the cascade. They climbed up the steep face of a hill, holding on by the bushes, and found themselves suddenly near the top; they then crawled on their hands and knees to the edge of a cliff, and looking over, the fall seemed to be about 500 feet of perpendicular descent. The thermometer, in boiling water at top and bottom of the fall, gave 206° and 208°. The scenery was most sublime; untrodden forests surrounded them, mountain ranges of 4000 feet altitude were before them; and, above all, the glorious fall rushing into the abyss, with rainbows amongst the foam of its waters, there 100 feet broad.

The rains set in before the travellers could penetrate any farther, and dysentery attacking Mr. Hillhouse, they retraced their steps. Every night they landed, and slept in their hammocks between trees; but they had neglected to take any covering for them. A painted sheet would have effectually protected them; but, except when the Indians cut a few leaves, and made a shed, they were forced to sit on their boxes, under a large umbrella, back to back; and this for three nights.

One evening they heard a man howling in the woods; they landed, and found an Arrawak Indian, swinging in a hammock, between two dead bodies on each side of him, also in hammocks. He swung his hammock from side to side, and thus caused the dead also to swing, all the time uttering the most distressing cries. On inquiring what was the matter, he said that the corpses were those of his brothers, who had just died from injuries they had received from an unfriendly tribe, who had passed up the creek in the night; but no wounds were apparent on the bodies, and they were taken down and laid on the ground. The surviving brother then cut thorny twigs, and beat the bodies all over, uttering at the same time 'Heia! heia!' as if *he* felt the pain of the flagellation. He next took the grease of a hog just killed, and anointed the mouths and faces of the dead, grunting all the while; then seeing that it was impossible to reanimate the lifeless clay, he opened their eyes, and beat the thorns into the eyeballs and all over the face—it was a dreadful sight; at last he was persuaded to bury them; a sheet was thrown over them, the grave filled up, and strewed with leaves.

The Arrawaks say that they believe in a Supreme Creator of all things, who has a brother, the governor of the universe; there is also an evil spirit, whom they endeavour to conciliate by means of their pe-aye-men, or sorcerers. A calabash, with pebbles in it, is used by these men to cast the evil spirit out of the sick. Their tradition of the creation is, that the Great Spirit sat on a silk-cotton tree, and cut off pieces of bark, which he threw into the stream below him, and becoming animated, they assumed the forms of all animals; that man was last of all created; that a deep sleep fell upon him; he was touched by the Deity, and found when he awoke a wife by his side. The world becoming desperately wicked, was *drowned by a flood*, only one man being saved in a canoe; from which he sent out *a rat* to discover if the waters had subsided, and it returned with a head of Indian corn.

Mr. Hillhouse and his companion persuaded the Indians to dam up a creek, so as to inclose a large space; the roots of the hyaree (a poisonous palm) were then beat up with water in a canoe and thrown into the creek, and fish in thousands, in a short time, came to the surface. The Indians shot them rapidly with their arrows, and the rest by degrees recovered from their stupor, but deserted the creek for some weeks after. The travellers then returned to George Town, having collected many specimens of birds, insects, minerals, &c., and explored a most interesting district, hitherto undescribed.

Two years ago, a Mr. Smith, a mercantile man from Caraccas, was joined at George Town by a Lieutenant Gullifer, R.N. They proceeded down the Pomeroon river, then up the Wyeena

creek, travelled across to the Coioony, sailed down it, and then went up the Essequibo to the Rio Negro, which, it appears, connects the Amazons and Oroonoco rivers. At Bara, on the Rio Negro, Mr. Smith, from sitting so long cramped up in coorials or canoes, became affected with dropsy; and allowing himself to be tapped by an ignorant quack, died after a fortnight's illness. Lieutenant Gullifer sailed down the Rio Negro to the Amazons, and remained at Para for some months, till he heard from England. From domestic details he received at Para, he fell into low spirits, and proceeded to Trinidad, where, one morning, he was found suspended to a beam under the steeple of the Protestant church! His papers, and Mr. Smith's, consisting of journals of their travels, were sent to a brother of Lieutenant Gullifer's, on the Marocco coast of Essequibo, where I went and saw the papers, and was most anxious to obtain them for the Society; but Mr. Gullifer said that he must consult first with the other relatives.

Among other interesting details I found in their notes, I may mention the following:—High up the Essequibo they fell in with a nation of anthropophagi, of the Carib tribe. The chief received the travellers courteously, and placed before them fish with savoury sauce; which being removed, two human hands were brought in, and a steak of human flesh! The travellers thought that this might be part of a baboon of a new species; however, they declined the invitation to partake, saying that, in travelling, they were not allowed to eat animal food. The chief picked the bones of the hands with excellent appetite, and asked them how they had relished the fish and the sauce. They replied that the fish was good and the sauce excellent. To which he answered, 'Human flesh makes the best sauce for any food; these hands and the fish were all dressed together. You see these Macooshee men, our slaves; we lately captured these people in war, and their wives we eat from time to time.' The travellers were horrified, but concealed their feelings, and before they retired for the night, they remarked that the Macooshee females were confined in a large logie, or shed, surrounded with a stockade of bamboos; so that, daily, the fathers, husbands, and brothers of these unfortunate women, saw them brought out, knocked on the head, and devoured by the inhuman cannibals. Lieutenant Gullifer, who was *in bad condition*, got into his hammock and slept soundly; but Mr. Smith, being in excellent case, walked about all night, fearing that their landlord might take a fancy to a steak of white meat. They afterwards visited a cave, in which was a pool of water; the Indians requested them not to bathe in this, for if they did, they would die before the year was out. They laughed at their monitors, and bathed; but sure

enough were both 'clods of the valley' before the twelvemonth had expired.

I have thus given a few notes respecting this region, and hope at a future period to supply some of their deficiencies. Through the kindness of Providence, and a rigid system of abstinence in living, I have hitherto preserved my health. My habits are to rise early,—to wash and sponge immediately from head to foot,—to take some active exercise always before breakfast,—through the day to act as my feelings and occasions suggest, with little or no particular precaution, only avoiding acid or even green food; and at night, before going to bed, to rub my whole body with a very coarse hair-glove or flesh-brush, thus clearing the pores, and equalizing the whole circulation. I mention these particulars on account of the remarkable benefit I have experienced from attending to them. J. E. A.

V.—*Some Remarks relative to the Geography of the Maldiva Islands, and the Navigable Channels (at present known to Europeans) which separate the Atolls from each other.* Communicated by James Horsburgh, Esq., Hydrographer to the East India Company. Read 9th January, 1832.

THE mutability of geographical knowledge, in one case, has been noticed in the first number of the Journal of the Royal Geographical Society, by a member who has evinced uncommon energy in the elucidation of science in general, and of geography in particular,—New Shetland Isles, as there stated, being only a *re-discovery* by Mr. Smith in 1819. And the fact of either these isles, or Trinity Land to the south of them, having been seen September 7, 1599, by Dirck Gheritz, in the Dutch ship, appears not to have been believed by navigators, although in vol. ii., p. 198, Burney's South Sea Discoveries, it is recorded, that the yacht of 150 tons burthen, commanded by the above-named navigator, was separated from the other four ships, her consorts, in a storm, and 'carried by tempestuous weather to the south of the strait (Magalhaens) to 64° south latitude, where they discovered a high country, with mountains, which were covered with snow, like the land of Norway *.'

Another remarkable case, relating to oriental geography, has been noticed by the late Mr. Dalrymple, in his memoir concerning

* [New Shetland was supposed to have been seen also by Sir Francis Drake; and was certainly discovered and used as a sealing station by the Anglo-American merchants of New York, so far back as 1812-13. It was still, however, literally, a re-discovery by Mr. Smith in 1819, he having published his intelligence, and given it to the world; while they cautiously guarded theirs to preserve the monopoly.]

THE

MALDIVA ISLANDS

From Captn. Horsburgh's Chart

1814

Mangalore
Tellicherry
Calicut
Ponany
Cochin
Quilon
Trivandrum
C. Comorin
Munahbaud
Tuticorin
Adam's Bridge
Pondicherry
Pt. Calymere
INDIA
Calpentyn
Colombo
Caltura
Galle
CEYLON
Elicalpeni
Amené
Underoot
Kalpeni
LACCADIVES
Minicoy
MALDIVES
Atoll Tilla Dou Matis
A. Milla Doue Madoue
A. Padypolo
A. Cardiva
Channel
Cardiva
Atoll Male or Maldivas
King's I. or Maldiva
Pouhadous Chan.
A. Pouhadous
A. Moluque
A. Colomandous
Colomandous Chan.
A. Adoumatis
One and a half Degree Channel
A. Souadou or Souadiva
Equatorial Chan.
I. Addou
South Chan
Atoll Pona Molubque
Equator
East of Greenwich

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the Chagos, and adjacent islands. He there adverts to a manuscript in his possession, belonging to the late Sir Joseph Banks, which, from *internal evidence*, was earlier than the year 1575. 'This very curious manuscript (observes Mr. Dalrymple) is painted on parchment, with the Dauphin's arms, and contains *much lost knowledge*. Kerguelen's Land seems plainly denoted; and the *east coast* of New Holland, as we name it, is expressed with some curious circumstances of correspondence to Captain Cook's manuscript. What he names

Bay of Inlets, is in the manuscript called			Baye Perdue.
Bay of Isles	„	„	R. de beaucoup d'isles.
Where the *Endeavour* struck		„	Coste Dangereuse.

So that we may say, with Solomon, (observes the late celebrated hydrographer,) "There is nothing *new* under the sun." '

Aristotle, in his Treatise on the World, dedicated to Alexander the Great, adverting to the situations of the larger islands known at that time, observes, that 'Taprobane (Ceylon) and the island called Phebol, which is situated towards the Arabic gulf, are not inferior in magnitude to the Britannic islands.' There are no islands in those seas of sufficient magnitude to answer the above description, excepting Socotra and Madagascar; the former of which seems to have been well known to Aristotle, for it is said that, at his request, Alexander brought a colony from Greece to this island, in order to secure the trade carried on with aloes. On the other hand Madagascar is not near the Arabic Gulf; and it seems, therefore, uncertain, whether Socotra or Madagascar be the island mentioned by the great philosopher, under the name of Phebol, though the latter is much the more probable.

The preceding remarks are merely introductory to the observations now to be given, concerning the Maldiva islands, and which are intended to elucidate in some measure the navigable channels and geographical limits of these islands, long obscured from the knowledge of Europeans, until lately a re-discovery of several safe channels has been effected.

This coral chain of innumerable isles and reefs extends nearly on a meridian from latitude 7° 6′ north to 40′ of south latitude, or 466 geographical miles; but in no part is the breadth of the chain thought to exceed 46 or 48 miles in a direct line, although the westernmost limit of the northernmost group, or Atoll, is in longitude 72° 48′ east, and the easternmost boundary of the chain is in longitude 73° 48′ east.

As this extensive and remarkable barrier of isles and dangers is situated directly in the route of ships coming from Europe, and destined for the island of Ceylon, or the southern parts of the peninsula of Hindostan, it may appear strange that an exploration of the Maldivas has never been undertaken, more

particularly as they have been much dreaded by navigators. In reply, and in justice to the Court of Directors of the East India Company, it ought to be known, that a recommendation has several times been transmitted to the Bombay government to this effect: but unfortunately, the unavoidable employment of the Company's marine vessels on regular service, has always prevented the laudable suggestion of the court from being acted on.

An exploration, however, of four safe channels has been effected amongst the southern Atolls, by the skilful exertions of Captain W. F. W. Owen of the Royal Navy, and other modern navigators, of great importance to such ships as frequent those seas. The southernmost is *Addon* or *South Channel,* about five or six leagues wide, formed between Pona Molubque Atoll (the south Atoll) and the island Addon, which isle is in latitude 0° 20′ south, and about five miles in length.

The *Equatorial Channel,* formed between Addon isle to the south, and Atoll Souadou or Suadiva to the north, is ten leagues wide, and clear of danger, the southern limit of this Atoll being in latitude 0° 11′ north. But the best of the old charts mark the south limit in latitude 0° 3′ south; and Pirard de la Val, who resided long among the Maldiva islands after being shipwrecked in the Corbin in 1602, describes the Equatorial Channel as twenty leagues wide, and of greater breadth than any of the other channels,—which is not correct, as this channel is only ten leagues wide, and much narrower than the other channel now to be described.

The *One and a Half Degree Channel,* is seventeen leagues in breadth, formed between Suadiva Atoll and Adoumatis Atoll, the northern limit of the former being in latitude 0° 58′ north, and the south extremity of Adoumatis Atoll in latitude 1° 49′ north, longitude 73° 33′ east, these boundaries of the channel bearing nearly *true* north and south of each other. This is the widest and safest of any of the Maldiva channels, and is now frequently used by ships proceeding towards Ceylon in the westerly monsoon.

Collomandous Channel, is only seven or eight miles wide, but may be considered safe according to the report of Captain Chatfield, of the ship Daphne, who passed through it, August 27, 1822; and his Majesty's ship, Sir Francis Drake, had previously gone through it in July 1808. On the south it is bounded by Adoumatis Atoll, the northern isles of which are in latitude 2° 7′ and 2° 9′ north; and on the north side, its boundary is the southern edge of Collomandous Atoll, situated in latitude 2° 13′ north, longitude 73° 21′ east.

These four channels mentioned above were, until lately, unknown to English navigators. It may also be noticed here, that the isles Diego Rais, Gama, and others, placed in the old charts near the southern limit of the Maldivas, have no *real existence;* but the

error probably originated in ships which saw the island Addon, or else the south group, Pona Molubque, and marked them down as isles far detached from the Maldivas, arising from the true positions of these ships being unknown, when they were navigated by dead reckoning.

We are yet very ignorant of the geographical situation of any channel to the northward of those already noticed, although other channels are known to exist, one of which, supposed to be in about latitude 4° north, or a little under, formed between Poulisdous Atoll to the south, and Male Atoll to the north, and called *Poulisdous Channel*, is thought to be rather contracted and unsafe.

Cardiva Channel, although little known to modern navigators, is thought to be very safe, and it appears to have been much frequented about two centuries ago, as may be perceived by the following account of Captain Davis, of Limehouse, who was pilot of a Dutch ship in 1600. On the 23d of May, in this year, they fell in with the Maldiva islands, and anchored; but the situation is not given: here they remained till the 27th, when they weighed, and struck into the true channel, called *Maldiva*, by Davis, which name seems to have been appropriated to the Cardiva Channel at that time. He describes it to be in latitude 4° 15′ north, that vast numbers of ships, from all ‘parts, went through this channel, which was the only safe sailing, as to miss it was generally fatal.’ The latitude of this channel, 4° 15′ north, as stated by Davis, cannot be correct, as this parallel passes directly over the centre of Ari Atoll, and also over Male Atoll; but the Cardiva Channel is, no doubt, several leagues farther north, if any reliance can be placed on observations taken on board the Company's ships Abington and Josiah, which ships passed through it on the 3d and 4th of March, 1704, on their voyage from England towards Madras, in company, and made the latitude about 4° 50′, or 4° 45′ north. These ships having fallen in with the eastern side of the Maldivas, during light north-easterly winds, were drifted into the Cardiva Channel, and carried through it to the westward by a current running at the rate of two miles per hour.

The Concord, bound from England to Madras, passed through this channel, September 8th, 1709, according to the following extract taken from that ship's journal. At one A.M. saw land on the starboard bow:—‘At two and a half A.M. bore away N. by E., thinking we were in a fair way to round Ceylon; but soon after, seeing land to the S.W. which we could not weather, tacked and made several boards till nine A.M., then found we were on the west side of the Maldivas: saw houses and people on the shore. Perceiving a large opening to the eastward, we resolved to proceed through, and found it a *large commodious channel*, in which no ground was obtained. At noon we were within the islands, the

westernmost one in sight, bearing W. by N., distant three miles, when the latitude, by good observation, was 5° north.'

These islands were probably those of Goidu Atoll, which form the northern side of the channel; and from the noon station given above, the Concord steered mostly about E.N.E., twenty-four miles distance, until five P.M., at which time an island, thought to be Cardiva, bore south, distance two miles, and afterward no more islands were seen to the eastward in steering out in that direction. The variation of the compass at this time, 1709, in the Cardiva Channel, was about 7° westerly. The Concord's observation at noon appears to make the western entrance of the channel in about latitude 4° 50′ north, and not differing much from the observations of the Abington and Josiah.

Having briefly described all the navigable channels between the Atolls of the Maldiva chain, at present known to be safe for large ships, it may be interesting, as well as useful, to give some extracts from journals of the Company's ships, in order to prove that all the Atolls are not circumscribed by a *continued chain* or barrier of reefs and isles; but that, on the contrary, there are several openings in these barriers, safe for ships, and also sufficient depths of water for ships to pass over some of the Atolls from one part to another, inside of the sea-wall or barrier.

March 20th, 1682.—The ship Recovery, from Bengal, wind E.N.E., at noon observed latitude 5° 30′ north, then saw the Maldivas, the nearest island, N.W. by W., about four or five leagues distance, made it 6° 30′ meridian distance west from Point de Galle.

March 21st.—Light easterly winds in the night, with a hard squall at four A.M. At daylight found the current had set us to the N.W. among the islands, being nearly surrounded by them. At ten A.M. a boat came to us with a pilot, named Husan Tackra, who resides at the island Mapara. At noon anchored in twenty-five fathoms sand, Mabar, or Mafer Island bearing E.S.E., Watten Island E. by N., Landu N.E. by E., Malendu N.E. The weather being unsettled, with thunder, lightning, rain, and calms on the 22d and 23d, and stormy at N.E. on the 24th, we remained with two anchors down for security at this place until March 26th, when we weighed with a N.E. wind at four A.M. and steered S.S.E. and south till six P.M., then anchored in twenty-four fathoms.

March 27th.—At two P.M. weighed with the wind north-easterly, steered between two islands, and at nine P.M. anchored in twenty-two fathoms near the island Seckdiva, or Sediva, on which stands a pagoda.

March 28th.—With the wind to the westward of north, weighed at one A.M., and at four P.M. passed the island Cordue, or Car-

diva, expecting to anchor, but got no ground within half a cable's length of a reef that projects half a mile from the island, therefore passed on, expecting to find anchorage at another island, called Gafer, or Gafor.

March 29th.—Steered south and S.S.E. till seven P.M., with a brisk wind at W.N.W. till we came fair by the island Gafer: being night, and our pilot afraid, and having no soundings, we laid the ship's head to the northward till two A.M., then tacked to the southward, and at eight A.M. passed Gafer, leaving it on our starboard side—our course south, with a light W.N.W. wind, the current setting to the northward.

About three miles to the southward of Gafer there is a strait not above two cables' length from side to side, which we came through; and from this narrow strait bearing south, lies the small island Coddue, or Cagui, where we found soundings of nineteen fathoms, with Muckandu isle bearing S.S.W., not having had any soundings since we left the four islands at Sediva.

March 30th.—At five P.M. anchored in thirty-two fathoms with the island Muckandu bearing west about three miles distance. Our pilot was afraid to carry the ship nearer to King's Island until he received further orders; it being in sight, as we suppose, but he will not tell us. At seven A. M. sent him to a boat which was bound to Maldiva, and he was told that he need not fear to bring our ship nearer in, at the same time demanding to know what guns, and what Urippe (Europe) men we had on board. When our boat returned, weighed with a light breeze at west, the course various, luffing up for one shoal, and bearing away for another, which are easily discerned.

March 31st.—At five P.M. anchored, with Maldiva, or the King's Island, bearing S.S.W., about two leagues. Weighed in the morning, and have turned to and fro all the day.

April 1st.—At three P.M. anchored in twenty-five fathoms, the wind fresh at west. Weighed at daylight, and at eight P.M. anchored at Maldiva Island. Found here two Surat ships, two Achen ships; and one Bengal ship, which left that place about a month before us, and anchored at Maldiva about an hour after us. From Balasore we were thirty days till first anchoring among the islands, and fifteen days more till we reached this place.

In the foregoing abstract from the Recovery's journal, it will easily be seen that she was carried by a N.W. current among the islands of the eastern side of the large Atoll Milla doue Madoue, where she anchored, and remained five days inside of Mafer and the other islands adjacent. That after departing from the above-mentioned situation, she passed over the Atoll Padypolo; afterward entered the Male, or Maldiva Atoll, through a narrow channel at its northern extremity, and then navigated from north

to south over the whole extent of the Atoll, sometimes near to islands, but at other times amongst numerous shoals, which were easily discerned, so as to be avoided in navigating among them.

The Company's ship Rochester, from Bencoolen, bound to Madras, on the 14th of February, 1715, fell in with the eastern side of the Maldivas;—at noon she observed, in latitude 3° N., at that time thirteen islands bearing from S.W. to W., distant 2½ or 3 leagues, which islands appear to be those of Molucque Atoll. From this situation she made several tacks, with the wind from eastward, and saw the isles at times bearing to the westward; and on the 15th, at 2 P. M., one of them bore N.N.E. She continued, with an easterly wind, usually light, and a current setting to the southward, to traverse amongst islands till the 21st of February. At sunrise, on the 19th, there were seventeen islands in sight, bearing between S.W., and N.N.E.½E. At noon on this day, the latitude was 3° 25′ N., when thirteen islands were in sight to the northward, different islands from those seen at sunrise. 'On the 20th, at sunset, several islands bore N. by E., and S. by E. ½ E. the nearest distance about 3 leagues. Shoals were observed to unite the northern islands to each other, and, the wind being at eastward, we fell into a good channel just to leeward of the northernmost island, for we could find no ground all night with the deep-sea line; and, at 8 A.M., saw twenty-one islands bearing from N.E.½E. to S.E. by E., distant 4 or 5 leagues. At noon, latitude observed 3° 52′ N., two islands to leeward, one bearing W. by S. and the other W. by N., the latter being the westernmost island in this latitude. Upon our showing French colours, a Maldiva boat came alongside, and supplied us with some fowls. February 21st, steered, N. by W., fourteen miles, till sunset, the westernmost island then bearing S. by E., distant 3 leagues. Having been forced by the current to the westward of these islands, we intend to steer to the northward into 8° or 9°, in the hope of getting a westerly wind to carry us to the eastward. From sunset, steered N. and N.N.W. during the night of the 23d, until sunrise, and no more isles were seen.'

It appears, by the above abstract of the Rochester's Journal, that the isles first seen were those on the eastern part of Molucque Atoll, and during the six days she was navigating among the Maldivas, she probably passed over some part of that Atoll, or between it and Poulisdous Atoll, the next to the northward; and perhaps she passed also over a part of the latter Atoll, and afterwards was drifted to the westward by the current between Nillandous Atoll to the south, and Ari Atoll to the northward. No safe passage or channel hereabout is known to European navigators at present, although the Rochester was carried from east to west by the current, directly over this part of the Maldiva Atolls,

and frequently tacking in the night between the groups of isles, without discovering any of them until daylight; by which it may be concluded, that there are navigable channels for ships, either over some of these Atolls, or else between them.

The Rooke Frigate, Captain Simmonds, February 4th, 1700, bound to the Malabar coast, saw the east side of the north Atoll of the Maldivas, the nearest island in latitude 6° 40′ N., was about 2½ leagues distant, having five other islands on each side of it. Several boats came near, but would not come alongside. These islands, Captain Simmonds observes, are not *tied together* as represented in the charts, but are separated from each other, and have fine passages between them. A strong current set this ship along the islands to the northward, and, at 1 A.M., she was carried within 2 leagues of the northernmost island; but at daylight none of the isles were visible, although light airs and calms prevailed during the night. Variation of the compass 7° 5′ W. in the morning, and 6° 57′ W. in the evening.

The Albemarle, from Bombay, bound to England, on the 31st of October, 1707, saw, at 10 A.M., the islands on the west side of the Nillandous Atoll, bearing from N.E. to E., distant 5 or 6 leagues. At noon the observed latitude was 3° 34′ N., by which it appears that this Atoll extends farther north than marked on the chart published in 1784, by the late Mr. Dalrymple, in which chart the Atoll is delineated as a large circuitous reef, *destitute of isles;* whereas, the Albemarle saw the isles at 5 or 6 leagues distance, on the west side of the Atoll last mentioned. This ship had been carried greatly to the eastward by a current, and from the Nillandous Atoll, she steered to the S.S.W. with light winds, but was drifted by the current through the One and Half Degree Channel to the eastward, without seeing any of the islands on either side, until after being through: then, on the 7th of November, she saw the isles on the N.E. part of Suadiva Atoll, which she made in latitude 0° 51′ N., calling them Diego Rays, having no idea that these isles were a part of the Maldivas, or that she had been carried between the Atolls to the eastward; but she thought the isles seen, and called Diego Rays, were situated considerably to the westward of the Maldivas.

About the period when these ships were carried by currents amongst the Maldivas, prodigious errors in the reckoning frequently occurred, as will be perceived by the following brief statement, transcribed from the journal of the Company's ship, Darby, Capt. W. Fitzhugh, bound from England to Bengal. On the 28th of May, 1715, this ship left the Cape of Good Hope, and on the 18th of July, fell in with Se-Beeroo, or Great Fortune Island, in latitude 1° 23′ S., near the coast of Sumatra, which was mistaken for the Maldivas, an error of 1500 nautic or geographical

miles, in a run of fifty-one days. With variable winds from S.E. and S.W., she proceeded to the southward, sometimes in sight of the islands, and, when near the South Poggy Island, in latitude 3° S., it is marked in the journal as the southernmost of the Maldivas. Trieste Island, in latitude 4° S. is called Jameo, (or the imaginary island Gamo of the old charts,) thought to be situated to the southward of the Maldivas. She continued steering to the southward, in sight of the high land of Sumatra at times; and, in latitude 6° S., Keyser's Peak was seen: still mistaking the summits of the visible mountains on Sumatra for islands to the south of the Maldivas, she continued to steer to the southward, until August the 2d, in latitude 7° S. She fortunately fell in with a ship, and was informed that the low land then in sight was Clap's Island on the south coast of Java. She had at this time forty men down with the scurvy, and proceeded to Batavia for refreshments.

It is gratifying to contemplate the wonderful improvement of nautical astronomy since the period when these ships belonging to the East India Company were liable to such lamentable errors in their reckoning; for, at the present time, the Company's ships are navigated with such precision, that an error of twenty or twenty-five miles in longitude is considered inadmissible.

About thirty years ago American ships, navigated by dead reckoning in their voyages to India, were liable to errors of a most dangerous kind, by passing up to the westward of the Maldivas, when they thought themselves in the Bay of Bengal. An incident of this kind happened to an American ship bound to Calcutta, which vessel fell in with the high land of St. John, in latitude 20° N., near Surat, and, at first, thought it to be the coast of Arracan. This was a dangerous mistake, for the stormy weather of the S.W. monsoon had commenced, when it is difficult to clear the coast if a ship be driven to the northward of Bombay, on account of frequent severe squalls, and a high sea from the ocean running directly towards the land. But this ship, being a swift sailer, succeeded in making a passage along the coast to the southward, and around Ceylon, after discovering her mistake, and finally arrived at Calcutta. Her commander had been impressed with a belief that fine weather usually prevailed in India, and having previously been employed in trading to the Baltic, he remarked, that he never had seen such terrible squalls in the Gulf of Finland as those experienced on the western side of India.

VI.—*On the same Subject.* Communicated by Captain W. F. W. Owen, R.N. Read April 9, 1832.

Captain Horsburgh's object in the preceding paper appears to be to invite attention to the very remarkable fact, that the Maldiva Islands, one of the earliest discoveries of the Portuguese in the eastern seas, which spread out for above five hundred miles along the western face of India and Ceylon, and which thus lie in the direct route of all ships bound thither, should yet be still comparatively unknown to us. And as he has mentioned my humble services in attempting to remove this reproach, I venture to add some remarks to his, illustrative rather of our ignorance than of our knowledge of these islands; our information concerning which still dates from the early voyagers, and has remained nearly stationary for the last three hundred years.

My attention was first particularly drawn to them in 1806, when I commanded the Seaflower brig of war on the East India station, by the wreck of a French vessel on them, the captain of which was obliged to redeem his liberty, and that of his family and crew, by the sacrifice of his wife's chastity to the Sultan, one of whose privileges is the property of all shipwrecked mariners. I was then at the Seychelles, bound to Madras; and conceiving it a shame that this group should continue an absolute scarecrow to the navigators of the nineteenth century, when it had been familiarly visited by those of the sixteenth and seventeenth, I immediately resolved to seek a passage through them to the eastward, in order to examine its southern extremity in passing. Accordingly the land was made, as expected, in about 0° 10′ north latitude, and a strong current being found to set directly to the eastward, it was clear there was a passage at this place: however, as it was just sunset, and the charts placed islands in unbroken continuity across the very track, it was not thought expedient to run through in the night, blowing as it was a gale of wind, with rain, dead on the islands so laid down in the charts. I consequently hauled up, determining to beat to windward through the night under close-reefed topsails; but waking about four A.M., and hearing the sails flap,—learning also that the wind had suddenly died away, and recollecting that this phenomenon frequently occurred near coral banks, I immediately wore round, and stood in the opposite direction till day-light, when we discovered the reefs within three miles of us astern, so near had we been carried to them. I now examined the equinoctial channel, and ascertained the limits of it, but thick weather prevented my making any critical observations at this time. Thenceforward, however, I omitted no opportunity which offered of prosecuting my inquiries, and, with the assistance of several brother officers,* who had be-

* Particularly Lieutenant Henderson, of H.M.S. Sir Francis Drake.

come interested in the same object, and who, with myself, visited different points in succession, as opportunity offered, combined with inquiries among native pilots and others who had at different times approached the group, I at length succeeded in collecting the materials of which Captain Horsburgh availed himself in constructing his first chart, and to which nothing has been since added. I also took every opportunity of disseminating the information that I collected; and even, on one occasion, carried a convoy through one of the passages, to show its practicability experimentally, and to endeavour to overcome the prejudice existing against the navigation in their vicinity: in which I was thus far successful, that the equinoctial and other southern passages are now tolerably familiar, the northern being still, however, entirely unknown; and I regret that I cannot join Captain Horsburgh in entirely acquitting the Court of East India Directors of all blame on this account.

The word Maldiva, John de Barros says, is derived from *mal*, signifying, in the Malabar language, a thousand, or uncountable number, and *diva*, an island; and the group, he adds, 'although there are openings in it from five to twenty leagues wide, is yet so crowded in other places as to give the idea of a half-drowned orchard, the depth of water in the intervals being sufficient for the largest vessel, and yet the space in them not sufficient for her yards and sails.' Their productions he also enumerates minutely, especially the cocoa-nut,* both of the ordinary kind and of that called coco-de-mer,† almost peculiar to the Seychelles, the seed of which appears to have been borne thence to the Maldivas by the currents of the ocean, thus showing them to flow principally from west to east, as I found them. The beautiful cowrie-shell he also mentions as abundant, being fished for by a curious but well known process. The branches and leaves of the cocoa-nut are laid together and lashed up into bundles about the size of a wheat-sheaf, two of which constitute what is called a balsa, formed as on the coasts of Chili and Peru, on many parts of which they are the only means by which vessels can communicate with the shore. On these balsas they then take a number of trot lines, baited as we bob for eels, viz. with short threads attached to them at every five or six inches distance, and each with a bit of offal meat for bait, tied by a knot to prevent its slipping off. The shell-fish swallows this,

* In such esteem is this fruit held in this part of the world, that it is a common saying, both here and all along the Malabar coast, 'as fruitful, as profitable, as beautiful, &c. as a cocoa-tree.'

† Famous as a medicine, and once considered a better counter-poison even than the bezoar stone. When germinating it assumes a peculiar appearance; whence its meat, which is an insipid jelly, is supposed to promote fecundity, and its shell to cure venereal affections. A specimen of the fruit and drawing of the tree are in the Naval and Military Museum. Preparations from them fetch a very high value still in India.

knot and all, and is hauled up with the trot line; nor is this manner of fishing peculiar for cowries only, many other shells of the most valuable sea species being procured in the same way. When the balsas are loaded, they are paddled ashore, and the shells buried in the earth till the fish rot out of them. They are then washed out, and are ready for exportation, 'being so much better,' adds Barros, 'than copper for money, as they neither soil the hands nor render offensive odours.' (And to show that these islands are not without their value in a commercial point of view, were it only for this one article, it may be added, that cowries are at this moment worth not less than 20*l.* a ton in England, and 50*l.* to 60*l.* on the coast of Africa, where the interior seems about to be opened to our commercial enterprise by the Niger, along the banks of which this money is the only currency.)

These islands, Barros further says, abound in fish, which, in his days, were salted and exported to all parts of India, with fish-oil and jauggry, or coarse sugar, in exchange for which they import cotton (their weavers being considered the best in India), and rice, cattle, sheep, butter, ghee, &c., of all which trade only a most insignificant fraction yet subsists with Ceylon. 'The king and the people,' he adds, 'are Hindoos, but the subordinate governors are Moors, attaining to their situations by little and little; being admitted as merchants, and afterwards renting the public duties from the king, they are invested with administrative powers in order to enable them to levy the taxes.' I notice this because it is a curious fact, that on the contrary, in all the Arab governments from Muscat to Zanzibar, the money-brokers and renters of taxes as subordinates are mostly Banyans or Hindoos.

A much more minute account of the Maldivas, however, is to be found in the work of François Pyrard de Laval, published in Paris in 1679, and giving an account of his voyages from 1602 to 1607, of which I shall remark by the way, that very many of his descriptions of manners, &c. in the east are correct along the east coast of Africa down to the present day; and an abridged translation of his book would, therefore, I think, be an acceptable and useful present to the mere English reader now. The portion of it, which relates to the Maldivas, does not bear quite the same internal evidence of minute accuracy as the remainder; yet I shall quote from it largely—the work having become scarce.

The geographical description of the Maldivas by François Pyrard begins at his page 71, and is in brief as follows:—

'The Maldivas begin at 8° north latitude, and end in 4° south latitude, being two hundred and forty leagues in length, but seldom exceeding thirty or thirty-five leagues broad; and are from one hundred to one hundred and fifty leagues from the main land of Cape Comorin, Collan, Cochin, &c.

'They are divided naturally and politically into thirteen atollons and provinces. It is extraordinary to see these atollons environed by a great stone wall, in such wise as no space of dry ground even could be so well closed by walls as they are.

'These atollons are generally either round or oval in form, and about thirty leagues in circumference, more or less. They abut each other from north to south without touching, and between each two there are navigable channels more or less wide or practicable for small vessels. When inside an atollon this wall is seen all round to defend it from the impetuosity of the sea; and it is most appalling to behold, when near this bank on the inner side, the waves, following each other from a great distance, at length break against the said wall with a violence indescribable, each wave, particularly at high water, being higher, when in the act of curling over or breaking, than a house of common elevation, and appearing like a snow white wall absolutely inapproachable from without.

'Within these inclosures there are an almost infinite number of islands and islets, amounting altogether to more than twelve thousand; and the king takes his title accordingly—"Ibrahim Sultan, King of the Thirteen Atollons and Twelve Thousand Isles *." The inhabitants declare that the high tides and violent currents are always *diminishing* their number; and Pyrard observes, that each atollon is a shallow bank, and was formerly a single island, since cut up into small parts by the inroads of the waters. But this is not according to the received hypothesis or result of modern observation.

'Within the atollons there is always smooth water, and seldom more than twenty fathoms anywhere, nor even so much in many parts; all the shoals are of rock, stones, or sand, with from two to three feet water on them at low water, or even less on many, so that it would not be difficult to visit all the islands of the same atollon without a boat, were it not for a dangerous large fish, called by the natives *Paimones* (probably sharks), and because the bottom, being mostly of sharp coral, cuts the feet. There is also much of the tree coral, called *aquiry* or ackerry, which being broken into a small gravel is used to make the sugar or honey of the cocoa nut, by boiling it with its water †.'

'Amongst them, there are a number of uninhabited islands, some with trees and herbage, some bare banks of sand, others covered at high, and dry at low water; most of them infested with

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* I believe the actual number to be more than treble or fourfold this number.

† I have never seen such a use made of the cocoa-nut, and the author does not say whether it is boiled in the natural milk of the cocoa, which is not commonly used, or that which results from straining the rasped nut through clean water, which last is always used to make the oil for cooking.

land crabs (cacouoc), and sea lobsters; and many of them frequented by birds called pingay (*query* penguin,) which lay such a prodigious quantity of eggs, that one can tread no where clear of them. They care little for the natives, who do not eat them; nevertheless, they are very good food, and are the size of a pigeon, with black and white plumage. The heat of the sand assists them to hatch their young easily *. The sands which are thus used by the birds have no fresh water; but all those with wood on them have fresh water, though on some it is either bad or very scanty.'

Pyrard then gives the names of the atollons, which it is unnecessary to transcribe here; and adds,—

'The name of the whole chain of the atollons or kingdom, is in their language Malé-ragué, or kingdom of Malé; but the other people of India call it Male-diva, and the people are called by other Indians "Dives," meaning islanders. The channels which separate the atollons, cannot, for the most part, be passed by large vessels; but there are four much wider than the others, which may be navigated by the largest vessels. Nevertheless, they are all extremely dangerous, particularly by night.' He says also,

'I have seen in the Maldives, several charts, whereon the dangers and channels were very exactly marked.

'It is also remarkable, that, as I have before said, the atollons, being all in a line, and abutting each other, separated by channels of the sea, they have openings or entrances, two at each end of each atollon, corresponding to two in the neighbouring atollon; by means of which, the communication between them may be carried on at all times and seasons.

'This is most providential; for if there was only one opening to each, their intercommunication could not be carried on, because of the very rapid currents which set through the channels, at times to the eastward or westward, according to the seasons and circumstances.

'Thus, when the currents run to the eastward and from the westward, the vessels or barks of the Maldivans proceed to sea by the western passage, cross the separating channel, and enter the next atoll by its eastern opening; in like manner in going and returning, so that they never return by the same opening as that by which they go forth. Notwithstanding this great advantage in the natural and providential arrangement of the openings, many of their boats are annually lost, being carried off by sudden storms, or calms overtaking them in their passage from atoll to atoll.

* Neither have I ever heard of penguins before at the Maldives. The Dutch at the Cape of Good Hope use the penguin to great advantage; on the isolated rocks, such as Dassen Island, where they break all the bad eggs, and take all the good ones weekly, and send many thousands to the Cape market through the year. Like the tame fowl, the penguin goes on laying eggs, if her nest be continually robbed.

'Moreover these entrances differ from each other in breadth; some are tolerably wide, others are very narrow—the widest is not more than a hundred yards, and some are not ten. These gateways or entrances are all of them guarded, as it were, by an island on each side, which, if armed, could always prevent the approach or entrance of any vessel.

'As to the channels which are all called Candou, and separate the atollons, there are four easily navigable, by which large ships may pass through the Maldivas, as many of all sorts do very frequently pass; but they are not without danger, and many vessels are lost every year in them. It is not by design that ships pass through these channels, but the islands are in so long a chain, that it is difficult to avoid them; and in calms, and foul winds, ships are frequently carried on them in spite of their best efforts.'

Pyrard next gives an account of these passages; but, as it is in several places contradictory, and certainly erroneous, I shall not occupy the time of the Society with it, but rather pass to his general notices of the whole group.

'The Maldivas are fertile in fruit and other commodities necessary to sustain man; they produce millet, and another small grain like it, but black like turnip seed; the first is called *oora*, and the latter *bimby:* they have two harvests of them in the year, and make flour of them, which they boil with milk and the sugar of cocoa-nut; they also make cakes and pastry, and other sorts of provision with it.

'They also produce many roots, one in particular named *Itel pool*, which is gathered without being planted; it is round, and as big as the two fists. It is broken and ground down between coarse stones, then exposed to the sun on a cloth to dry, when it becomes a sort of starch or fine white flour, and will keep a long while: it makes excellent cakes or pastry, except that it is heavy on the stomach, and, to be good, should be eaten fresh.

'There are also other sorts of roots called *Alas*, some red like beet, and others white as turnips—these are cultivated and gathered in September only: they will keep nearly through the year, and form the principal article of their food; are cooked in various ways, and with the sugar or honey of the cocoa-nut—they are very well tasted. Wheat is called *Godang*, and rice *Andone*, but neither of them grow on the isles. They import much rice, which enters as a main article of their food in a great variety of messes, and when boiled simply, is used as a substitute for bread. It is also boiled, dried, and then ground into a flour, which is mixed with eggs, honey, or with the milk or oil of the cocoa-nut, and thus makes excellent tarts and other dishes.

'Fowls are in such abundance that they are propagated without domestic care, and are sold commonly at less than a penny

each, and three dozen eggs may be had for the same sum. They have many other land birds; their sea birds have already been noticed. Rats and mice are so numerous, as to oblige the natives to build their magazines of provision on piles or posts, and sometimes near the sea, at a hundred yards or more from the shore. There are said to be no venomous animals, except one species of snake, which is very dangerous. There are no horses, and but few horned cattle, which belong all to the king. They are generally brought from other parts, or rather a few were brought as curiosities, and have since multiplied to four or five hundred, for their flesh is only eaten at a few particular feasts in the year. They have no dogs, and have a truly Mahomedan horror of them.

'The atollons are wonderfully abundant in all kinds of fish, large and small, which, indeed, furnish a principal article in the food and commerce of the natives. Sharks are numerous; many of the islanders are devoured by them, and many are seen who have lost legs and arms by them.

'In consequence of this great abundance of all kinds of food, it costs but little to live; four hundred cocoa-nuts are sold for sixpence, five hundred bananas, a dozen fowls, or three hundred bundles of roots, &c. &c. for a like sum.

'It is proverbial that the natives never get rich, but that strangers become so quickly; because the natives have neither care, ambition, nor avarice.

'Throughout these isles there are no close towns, but the houses are built separately, each with its own garden and ground; and the lands of different proprietors are separated by narrow lanes, generally well shaded by shrubs in hedge-rows.

'The houses of the common people are built of the wood of the cocoa-nut tree, and thatched with the leaf; but the chiefs and the most wealthy build with coral, which they fish up from different parts for the purpose; it takes a good polish, and is sawn and hewed into the shapes required. At first it is very white, but loses its colour after some exposure to the weather; and becomes quite black in time.

'The manner of fishing up the large blocks of coral is curious. There is a wood which grows on the islands, called candou*, which, when dry, is lighter than cork; the tree is something like, and of the size of the aspen; it bears no fruit, and is not fit for fuel: but its plank is used as our fir-deals. Having noted the block of coral they want, a rope of sufficient magnitude is attached to it, even at great depths, for both sexes are extremely expert swimmers and divers; pieces of candou are then sunk and lashed to the block, until there be enough of them to float it, and its roots being loosened, it rises to the surface attached to its raft, and

* Pyrard thus uses the word candou both to designate the passage between the atollons and buoyant wood.

is borne by it to the place required. This wood, however, soon becomes water-soaked, when it must be dried in the sun before it can be again used for the same purpose.'

(I shall here take occasion to observe that a belief generally prevails that the blocks of coral resemble vegetables, that a root is necessary to them, that if merely broken down to the surface they continue to grow, but that they may be rooted out. And on this principle a late governor of the new colony of the French at St. Mary's, Madagascar, cleared out and made a beautiful little port at that place; and by similar means the inhabitants of the Maldivas can always secure to themselves good outlets and inlets from and to their atollons. And thus says Pyrard—'The port of the island of Malé, being full of large rocks, so that vessels could not anchor in it, was completely cleared of them, and rendered navigable and safe.')

'There are two languages in the Maldivas, the common, which is peculiar to the people, and the Arabic, which is the learned language, and much in esteem; it is to them what the Latin is to Christians.' (It appears that they have also, at this day, a peculiar alphabet, differing from the Arabic and from the Sanscrit, and its derivatives in Hindostan, Ava, Siam, and the Malay Islands. It is written like the Arabic, from right to left, and the vowels are indicated by points in the same manner. Of this sort is a manuscript in the possession of Sir Alexander Johnston.)

Having thus given a brief outline of what is at present known of the Maldiva Islands, I shall tender the Society some loose hints which the occasion has suggested to me.

Of the island of Diego Garcia, which is the extreme southernmost of the whole group of Maldivas, and long considered as unconnected with any other, we have numerous notices; and Mr. Horsburgh, in his East India Directory, gives an excellent description of it. It is the place of banishment for lepers from the Mauritius and Isle Bourbon, where they make cocoa-nut oil, and catch turtle for exportation; and it is as famous in this way in these seas as Ascension in the Atlantic. Its lagoon forms one of the finest harbours in the world; but it is believed that there are many others of a similar description, and equally good, in the other atollons. When I commanded the Baracouta, in 1811, I entered it by the western channel, and left it by the eastern, which, contrary to Mr. Horsburgh's notice, I found quite clear and safe, with not less than three and a half fathoms in it. And nothing would be easier than to examine the whole of these islands in the same way; for their chief is proud to claim a dependence on the British at Ceylon; whither he sends an annual embassy, bearing presents of the products of the islands, and receiving others in return, with certain privileges of trade.

The word atoll or atollon, used to signify the groups into which the

Maldivas are divided, means, in strictness, only, the chaplet or circle of coral on which the islands rest, and which incloses them—the sea-wall, in short, which Pyrard describes. This, in many places, scarcely attains the surface of the water; in others it forms a long sandy beach, perhaps less than six feet above the level of the sea; and the highest land in the groups does not, I should think, exceed twenty feet. The islands, indeed, are just the higher portions which have gradually become covered with soil and vegetation, and which cease to acquire additional height so soon as this takes place, when the labours of the minute insects to which they owe their formation are diverted into other directions. A remarkable circumstance characterises all the islands which have been seen or visited, and is believed to be found in the whole, namely, their circular shape, inclosing a lagoon, or what has been a lagoon; which is the more striking, as it is found to prevail, almost without exception, in all islands of the same formation. For example, the islands off Cape St. Anne, near Sierra Leone, though by no means so purely coralline in their nature as the Maldivas, (and differently circumstanced, being near the mouth of a considerable estuary, whereas the Maldivas are from one to three hundred leagues from a continent, in which are no great rivers,) retain yet this peculiarity, down even to the smallest of them,—an isolated sand-bank before the entrance of Port Owen Tudor, with not a blade of herbage on it, only two hundred yards in circumference, less than fourteen feet high, situate on the outer edge of the wall of coral to which it belongs, and exposed to the full beat of the Atlantic Ocean,—which yet has on its summit two considerable pools of pure fresh water, some feet in depth. And Sherboro' Island, on the same coast, has a peculiarity still more remarkable; for on its southern shore, or sea-face, there is a lake of pure fresh water of considerable extent, just within high water mark; and inside of, and close to it, another still larger, salt.

All the Maldiva Islands of any extent are richly clothed with wood, chiefly palms; but no edifice has been seen in sailing past any of them, whence it may be concluded, that none exists higher than a cocoa-tree. As Pyrard states that most of them have abundance of fresh water on them. but that some are deficient in this article, some remarks on the anomalous and extraordinary situations in which it is found and not found in different parts of the world, and on its supposed connexion with the growth of cocoa-nuts, may not be unacceptable, as having fallen under my own observation.

At Madras, which is surrounded by salt water, the purest fresh water must be sought in wells dug below the sea-mark; elsewhere, to whatever depths the wells are dug, the water is brackish;

and this is a land of palms and cocoa-nuts. Again, there is a string of low coral islands in the Mozambique Channel, called the Primera Isles by the Portuguese, which have no palms, but numerous stately casuarina-trees of the largest dimensions. Pits were dug in several of them by the Leven's crew in 1823 fourteen feet deep, and many similar trials have been made by other navigators, but always without success; whence another fact is learnt, namely, that the casuarina pine does not require fresh water at its roots, and, indeed, I have elsewhere seen it even on reefs mostly covered with the sea. These islands, it may be also added, in every respect resemble the Sherboro' and Cape St. Anne Islands already noticed, in character and situation, with this one exception; for they are coralline and near a great continent which produces all the palms abundantly, with many great rivers entering the sea in their immediate vicinity.

Lastly, the great Comoro Island, which is thirty leagues in circumference, and whose mountains, it is believed, rise to the height of eight thousand feet above the sea, is said to retain no water in its earth, being volcanic, though with abundance of cocoa-nuts; and it is very thinly inhabited in consequence, the natives being frequently obliged to satisfy the thirst of their cattle with the young cocoa-nut milk, and never drinking any other beverage themselves. This last circumstance, however, does not always indicate a want of water, for in all the Malayan Islands, and in many parts also of Madagascar and the east coast of Africa, if water is asked for to drink, a young cocoa-nut is always brought and presented with its end cut off.

This paper shall now conclude with a few desultory observations on the currents and tides in the Indian Sea, which, without being of much value perhaps themselves, may excite some attention to this curious subject.

Among the Maldivas, all accounts agree, that rapid currents are very common from the eastward at certain seasons of the year, and still stronger from the westward at other seasons. In September, 1806, or towards the close of the south-east monsoon, little current comparatively was found through the Maldivas. In December, 1810, with the north-west monsoon*, a current exceeding four sea miles an hour, set the Barraçouta through the equinoctial channel, and its influence was felt sensibly, but with less force, more than half way across the Bay of Bengal; it is also known to extend from the Seychelles, four hundred leagues to the westward of the Maldivas, as proved by the drifting of the Coco-de-mer.

* The monsoons in India Proper are distinguished into north-east from October to April, and south-west in the other months; but in the eastern seas, and to the south of the line, into north-west and south-east monsoons. At the Maldivas the north-west and westerly winds are by far the most prevalent.

In November, 1811, a similar current was experienced in the same parts. Although currents, in the opposite direction, do run from the eastward about March, April, and May, and perhaps later in the year, yet their influence is neither so extensive nor so violent. It is, therefore, believed, that these evidences of an accelerated motion of the waters in the open ocean must be occasioned by submarine obstructions approaching much nearer the surface in the regions of the current than towards the southern pole, whence the waters flow.

There is a perennial current from the Querimba Islands, or from 10° S., to the Cape of Good Hope and into the Atlantic Ocean,—which embraces the shores of Madagascar. This current is particularly manifested from the shoal of Pinda, near Mozambique, to Quilliman, in the channel of that name,—round the bank of the south end of Madagascar, and from the river St. Lucia quite round the bank of L'Agulhas. Hence it may be inferred that the Atlantic Ocean is but a larger Mediterranean Sea, whose evaporation requires to be resupplied from both poles; that the channels from the north are insufficient for the purpose in summer; and in winter the congelation must be supplied, whence a constant supply is necessary from the south, the fountain of the great deep. On this hypothesis, a current would necessarily set round Cape Horn likewise; which also is the fact; for although it is not so manifest a few leagues from the Cape, it is sufficiently marked in the straits of Le Maire and Magellan.

From Quiloa, on the east coast of Africa, northwards to the Red Sea, the currents take the direction of the monsoons, and are equally strong in both directions, particularly between Zanzibar and Mogadoxa, or Mukdéesha. The breadth of the stream of strong currents is seldom found great. They can, in general, only be contended against by ships keeping very close to the shores, or crossing them until out of their influence. Those which scour the coasts seldom extend so as to affect navigation more than twenty or thirty leagues beyond soundings in one hundred fathoms. On the desert shores of south-west Africa, quantities of drift wood are seen of such dimensions as could only be furnished from the Mozambique channel or Madagascar, unless, indeed, New Holland or Java should be assigned for their origin. It is remarkable also that the currents above-described, differing as they do from the motion of the tides, which last are known to be semidiurnal, do also differ from them in another particular. The tides are most rapid always near the times of the syzigies; at those times the currents are usually very tame; and when tides are at the neap or most slack, then currents are most rapid. This observation has been verified in those parts of the coasts of Africa subject to currents from the Red Sea to the Gambia.

The phenomena of the tides also still require some familiar explanation to account sufficiently for all their effects. Thus the tide is full at Scilly about six or seven hours before it is full in the Downs, distant more than one hundred leagues; and it is a popular notion that the mass of water to supply the difference between full and low tide flows from at least that distance. But if this were true, the water must move at the rate of fifteen miles per hour; whereas the tides in the Channel never exceed two miles per hour, except near the shores, and then seldom four miles. Do the tides partake in any way of the nature of the billow or wave, whose motion does not depend upon, and may even be opposed to that of the particles of water which compose it? The very different phenomena in the Southern Ocean, deserve remark. It is high-water at Mauritius between twelve and one, and on all the eastern shores of Africa, and both shores of Madagascar, from Cape Guardafui to Delagoa Bay, nearly at the same time, or between half-past three and half-past four o'clock, that is, within the ports facing the ocean, where the tide has not to flow over much extent of tangible soundings. On the outer edge of soundings, in all that extent, it may be said to be high water at full and change, nearly at three o'clock; at the Cape of Good Hope half an hour earlier, or between two and three o'clock; and nearly at the same time in all the South Atlantic, but rather later as we proceed northward. At St. Paul de Loando, Fernando Po, Ascension, and Fernando Noronha, in the Atlantic, and at Delagoa Bay, Mozambique, and Mombas, in East Africa, it is high water on the days of full and change at the same instant, nearly, viz. from four o'clock to half-past four; and it is high water at Rio Janeiro nearly at the same instant as at the Cape of Good Hope, viz. between two and three o'clock. At Sierra Leone and the Gambia, and at Sofala, being situated within the coast-line of soundings, the tides are retarded near three hours.

These are loose notices; but it was thought this general view of the subject might excite some interest, as the various publications, where the tide establishments are recorded, disagree much from each other, and many of them from the fact; which may demonstrate that this is a wide field, worthy of more critical examination and deeper study than it has ever yet received.

VII.—*Account of the Cossyahs, and of a Convalescent Depot established in their Country, 280 miles N. E. from Calcutta.* Extracted from the private Letters of an Officer quartered there; and communicated by Lieut. Murphy, R.E. Read 9th Jan., 1832.

'Chirra, 28th May, 1831.

'You will not be able to find this place in the map, but it is in latitude 25° 12′ 30″ north, and in longitude 91° 35′ east, thirty miles to the north-west of Sylhet, and about 4000 feet above the level of the sea. The climate was so favourably spoken of, that last July government decided upon forming a depot here, and ordered a detachment of convalescents to be sent up, whom I volunteered to accompany. We left *Dum Dum* on the 19th of August, and arrived here on the 4th of October, the last day giving us a fatiguing march of nine hours from the foot of the hills. But we were more than repaid by the delightful climate. When we left the boats the thermometer was at 93°;—up here it was only 76°. All the men rapidly improved in health, and became as stout at when they left home. The rains have now set in, which are not so pleasant; but we have, at the same time, the satisfaction of being able to wear warm clothing, while our friends on the plains are grilling in white jackets under a *punkah.*

'The ground granted by the native Cossyahs for the *sanatarium* consists of a table-land about two miles long, by three-quarters, or a mile in breadth. At the northern extremity of this are low hills, varying in height from 50 to 150 feet, on which the officers' quarters, the barracks, and hospital are situated. We are bounded on the north-east, east, and south, by an immense valley, about 2000 feet deep, which commences a little to the northward, with a perpendicular face of sandstone rock; the side next to us is also perpendicular in several places; but in other parts of the valley the mountains slope, and are broken into numberless ravines, forming a prospect of which I should find it difficult to give you even a faint idea. From November until March, or, I may say, April, no climate in the world could surpass this; during December and January there was constantly a hoar frost on the ground at night, which of course disappeared soon after sunrise; and all day we had a beautifully clear sky, and a fine bracing cold air which *obliged* us to move about; so cold was it, indeed, that when engaged in writing I have frequently been obliged to lay down my pen and run out in the sun. You may judge what a treat this was to one accustomed to the climate below: here we never yet had occasion to carry an umbrella except when it rained.

'To the north, about a mile off in a direct line, is *Chirra Poonjee,* or the village of Chirra, built upon hills two or three hundred feet

higher than ours, and separated from us by a rocky mountain-stream, which forms also our western boundary, and continues to the southward till it falls into what is called the *Moosnyi* valley, forming a waterfall, just now of the grandest description. Beyond this boundary there is a high wooded hill, composed solely of limestone, in which are some very beautiful caves.

'The Cossyahs are a fine race of people, far superior to any Asiatics I have seen. They resemble the Malays a good deal in appearance, but are stouter built, owing to the nature of their employment in bringing loads from the plains, to which they are accustomed from an early age, women and all, apparently; in fact, of the two sexes, I think the *fair* has the advantage in point of stoutness. They are also a good-humoured cheerful people, a quarrel being almost unknown among them. All their burdens are carried resting on the back, by means of a sling made of split bamboo, which passes across the forehead; in which manner they will bring up, over a most difficult road of about twelve miles, weights or loads of from a maund to a maund and a half, or from 80 to 120 lbs. for themselves, though for us they will not bring more than about 60. They are honest almost to a miracle, though extremely fond of spirits. Prejudices of caste they have none that I can see, unless we may consider burning their dead one. The spot where this ceremony is performed, is afterwards marked by a stone inclosure; the ashes being collected, put into earthen jars or pots, and then deposited in a regular square stone box with a small door to it, over which they erect immense slabs of stone, varying in number from three to seven, according to the wealth (not rank) of the deceased,—thus I have seen some of these stones at least twenty feet in height. The hills near the village are covered with these monuments of departed wealth, and bear some resemblance, I think, to an English burial-ground.

'I have said that the Cossyahs are a fine race, but must not omit to add that they are likewise a dirty one, washing being a luxury they seldom or never trouble themselves about. There seems but little distinction between the rajah and his subjects. His hut is in nothing better than the rest, and all his revenue from the *civil list* is derived from fines which he has the power to levy: his turban and the cloth he wraps round his shoulders when paying his respects are certainly somewhat cleaner than those of his suite, but, in other respects, I fancy he has an equal antipathy to water. Marriages are carried on among them with considerable regularity, and conjugal infidelity is seldom or never known. Bigamy is also prohibited. The right to the throne does not, as with us, descend to the sons of brothers or sons, but invariably to those of

sisters, so as (according to them) to preserve the royal blood pure and uncontaminated. They speak a curious language, not unlike the Chinese, but have no written characters; and it is wonderful with what accuracy they keep their accounts, which they do by notching sticks. I asked a lad one day how he managed when he wished not to forget anything; he replied that he broke some eggs and then remembered it. They do the same always before setting out on an expedition, to ascertain whether good or bad fortune will attend them, but in this respect I think that inclination often decides.

'It was about forty miles to the north of this that two officers of our regiment were murdered in April, 1829; and the Cossyahs are still in an unsettled state in that quarter, now and then taking the liberty of cutting off the *dâk* (post) to and from Assam. Our neighbours here, however, have always been friendly, and, I fancy, will find it their interest to continue so. As the place becomes more resorted to, they, of course, will get more employment. A party of six gentlemen came up the other day from Calcutta in a steam-vessel, to the foot of the hills, and their account of the place I hear has made the whole city of palaces desire to make a similar excursion. The steam-boat returned in six days, so you may imagine what an acquisition such a climate must eventually prove to residents in the lower provinces, who otherwise would be forced to sea, or, perhaps, home.'

[The Society having also received a copy of the report made by the master of this steam-boat, on his return, of the particulars of his navigation, some extracts from it are subjoined;—the track pursued being also indicated on the annexed sketch.]

The Hooghly left Calcutta on the 16th of April, at 4 P.M., to proceed by the Lower Sunderbun route for Chattuc, near Sylhet, the vessel being at her usual draught of water, viz. four feet five inches forward, and three feet eight inches aft. At 7 P.M. we arrived and anchored a short distance above Fulta. On the 17th, at 9-10, entered Channel-creek; but being low water at the time we met some little detention. At 1-20 P.M. entered the Sunderbuns; and at 7 P.M. arrived and anchored in the Tha-Kooran Gong, or Joomerah River.

On the 18th, arriving near the entrance of Manick Kally last quarter ebb-tide, to save time I wished to enter the Mutwall river by the branch called the Rain Choppi; but in attempting this the vessel took the ground at 7-10 A.M., and before I could run the kedge out to haul her off, the water fell several inches, and she remained aground until 10-40, when she floated with the flood-tide. While the vessel was lying on shore, I sounded across the

upper entrance of the passage, and the deepest water was four feet in the channels (it has a sand in the centre), and it would not exceed three feet low water, and, I think, must even dry in spring-tides. It is about one-third of a mile across, and has heretofore been considered by us as a good channel in event of being too late for Manick Khal. After quitting that place we pursued the route always taken by us; and, at 7 P.M., arrived and anchored in the south-west entrance of Coalee Khal, or Goodlad's Cut.

At daylight on the 19th, the tide being favourable, we proceeded on for Kulna, and arrived there at 4-30 P.M., and filled up coals to carry us on to Dacca. On the following day we were necessitated to wait until after the flood-tide was in, as it was stated that we should not find water sufficient for us to pass through Boicreb River at low water, it being very shallow. Near a bazaar, called Fakerah Haut, we were for some time, or about a mile, running in one fathom water, and at last took the ground; but being soft mud and a flood-tide, we hauled off in a few minutes. By an acquaintance with the channels we might have passed free, as there were a few inches more water than our draft at the time we arrived there, which was at the first quarter flood-tide. The river running in an east and west direction, the tide flows into it from both entrances; and it is in consequence shallow towards the centre, nor do I consider it passable for a vessel of the Hooghly's description, at this season of the year, *before* first quarter flood, or *after* half ebb, though from its being of a soft mud, a vessel getting on shore in it does not sustain any damage. After quitting this river we passed on without further delay, and, in the evening, arrived and anchored within eight miles of the station of Burrishal.

We proceeded thence, in pursuance of our voyage, at daylight, on the 21st; and at 6-30 A.M. passed Burrishal. The river thence to the Ganges (which we entered at 8 A.M.) was very shallow; and from its being low water at the time, we were frequently obliged to slow the engines, but nothing further. On getting into the Ganges we ran two or three miles down before we could get into the proper channel, and then ran up with a flood-tide about twelve miles. We next proceeded by a river taking a more eastern direction, called the Nautter River, and thence entered the Megna at 3 P.M., near a chokee, or village, called Niah Banguey, or the New Brake, proceeding down a few miles to cross over into the channel, which was, however, unnecessary, and only caused by the ignorance of our pilots, who, in two other cases, led us a wrong passage before we reached Dacca, besides several times detaining us to make inquiries of people as we were passing near the river banks. The Megna River, near a village named Boyra, a little north of Niah Banguey, is eight or ten miles across;

and, in bad weather, vessels, like the Hooghly, might meet detention from the sea that would rise there, though a run of from two to three hours would, in moderate weather, take them into shelter, there being several islands and rivers that would answer for that purpose below the river leading up to Dacca. The Ganges, for the short distance we ran in it, was about four miles across, and in it also, especially in the rains, some detention might be experienced in boisterous weather. Between the two great rivers there is plenty of shelter, and I do not apprehend there would be any detention from the Dacca river upwards, though there must be an immense sheet of water throughout the Megna during the rainy season, the country in its vicinity being said to be then generally overflown. On the 22d, at noon, we arrived at Dacca (and filled up coal), by which we lost one day's run. At 7 A.M., on the 23d, we left Dacca, and arriving in the Megna river at 10 A.M., proceeded up the branch called the Lowaddee; and at 6-40 P.M. arrived and anchored about six miles below Boirub Bazar, after having grounded and been unable to find a passage to proceed on.

On the 24th, at dawn, sent the boats with the chief officer to endeavour to find a channel; but, not succeeding, were in consequence forced to run back about five miles and take another passage. Thence we proceeded on, and, at 7 P.M., anchored in the river Soorma, about fifteen miles above Azmeriagunge, without experiencing any further difficulty, except once or twice slowing the engines for a few minutes, having got into shoal water. At Azmeriagunge we fell in with a pinnace that had been sent there from Sylhet, fearing we should not find water, to proceed above that place. On the 25th, proceeding on at 6-30 A.M., we entered a creek named Sitan Kally, which we found very narrow, winding, and shallow;—at the lower part only six feet water, and a current running about three miles per hour, which is caused, I imagine, by the upper entrance being broad, and the greater portion of the water from the Soorma running down it. The banks are steep and of a hard clay, so that great care is necessary in passing through, both ways, for fear of injury to the paddle-wheels and rudder.

From the northern entrance of Sitan Kally ('Chondpoor') upwards, we found the water much more shallow than below it, frequently not exceeding one and a quarter to one and a half fathoms; and off a village named Nugur, forty to fifty miles below Chattuc, there is a shoal extending across the river, which, in the dry season, is stated to have only three feet water over it. When we passed, there were six feet. From that place upwards we were several times in nearly our own draught, but did not touch the ground. We arrived and anchored at Chattuc at 5-50 P.M., and learnt that

there was not water for the vessel to proceed above two miles farther.

On the 26th, at day-light, the gentlemen of our party left in a bholeah and proceeded to Campanggunge, and I ascertained, by sounding in the boats, that there was not water to proceed more than two or three miles above Chattuc at that season of the year. The bholeah and a pinnace found no difficulty in getting up; and I am of opinion that it is practicable for bholeahs at all seasons of the year. Campanggunge is about fifteen miles from Chattuc and five miles from the foot of the hills;—from it our party proceeded by land.

There was a rise in the Soorma River, previous to our quitting Calcutta, of nearly three feet; but the water had fallen again, before we reached Chattuc, two feet; and continued falling until the morning of the 1st of May, when we had a very heavy fall of rain; after which it was as high as it had been this season, rising full three feet again.

The influence of the tide is felt at Azmeriagunge in the dry season, there being a rise and fall at this place, in the springs, of about a foot. The current was not running more than one mile per hour above the river leading to Dacca;—the water was very clear, with something of the appearance of sea-water; and from the want of stream, and being calm for some days previous to our arrival, the surface was, in many places in the Megna, covered with patches of a kind of green scum, or vegetable matter, similar to what is frequently seen in tanks. With one day's rain, however, and a fresh S.E. wind, which we had returning to Edrackpore, this quite disappeared, and the water remained clear, affording every facility for steam navigation, at least to the southern entrance of Sitan Kally, when the river is at the lowest ebb; but I cannot venture to affirm that there would be water sufficient for a vessel of the Hooghly's description thence upwards. From the report of the contractor for supplying the company with chunam there it appears, indeed, that there is not, as he informed me that his boats were forced to take out cargo at one or two places. The rise we had in the Soorma River was scarcely perceptible in the lower part of the Megna.

On the 2d of May, at 6 A.M., we left Chattuc on the return voyage for Calcutta, &c.

Brief View of the Progress of Interior Discovery in New South Wales. By Allan Cunningham, Esq. Communicated by Viscount Goderich—Read 27th February and 12th March, 1832.

AMIDST the ardour with which geographical research has been patronized and prosecuted in almost every other portion of the globe, it is a subject of surprise and regret that so little anxiety should have been shown by geographers, and even by men of science in general, to increase our knowledge of the interior of the Australian continent. But so it is,—that land of anomalies may still be said to be almost a *terra incognita;* and, limited as may be the information which we possess of its internal features, yet, with the conviction that some concise notice of the way in which that knowledge has been progressively acquired will not prove altogether uninteresting to the Geographical Society, I beg to lay before it, in a brief view, the results of the several expeditions, which have been employed in inland discovery since the first settlement was formed at Port Jackson; to which I have added, a few occasional remarks on the different routes which have been pursued, and which will be further illustrated by the accompanying map.

To that fine settlement, in whose internal prosperity and advancement I have, during my long residence among its inhabitants, ever felt a lively interest, I shall consider myself as having rendered no small service, if what may appear in the following pages should induce this society to promote, by such means as it may have at command, the more extensive examination of the interior of New South Wales. We possess colonies, on its eastern and western shores, which are daily exciting more and more interest in this country; and, should the tide of emigration continue to flow, as it has done for some years past, new land must be thrown open to meet the wants of the settlers.

It would appear that, from the earliest periods of the settlement at Port Jackson, there were not wanting individuals of skill and enterprise to undertake the task of inland discovery,—of whom it may suffice to mention the names of Bass, Caley, and Barrallier. But their utmost endeavours to penetrate beyond the Blue Mountains were entirely defeated by the difficulties with which they had to contend, and which, ultimately, obliged each party, after suffering great fatigue and privation, to return with the full conviction of the utter impossibility of passing to the westward of so formidable a barrier,—an opinion, which appeared, at that period, not a little supported by the fact, that such of the aborigines as had become known to the colonists, were totally ignorant of any pass to the interior, through that elevated chain of mountains.

A period of twenty-five years thus passed away without any information being gained as to the breadth of the Blue Mountain-ranges westerly, or the aspect of the country beyond them. At length, in 1813, the colonists were visited by a most distressing season of drought, in which the country, from the sea-coast to the base of the hills, was burnt up—the secondary water-courses entirely failed, and the cattle of the colonists, hemmed in on all sides, died in great numbers for want of pasturage. Out of evil how often does good arise!—for these most distressing circumstances were the means of opening the country, and saving the colonists. Three enterprising individuals, Messrs. Blaxland, Wentworth, and Lawson, were induced, at this period, to unite and employ their best exertions and experience, in making one other attempt to penetrate through that chain of mountains, which had been considered, for so many years, an impregnable barrier. With this determination they ascended the mountains near the Grose River (a tributary to the Hawkesbury), and by keeping steadily in view, that, which no preceding explorer had ever once thought of, namely, the fall of the waters into the Warragumba on the one side, and into the Grose on the other, they maintained their position on a main range, which although, from its intricate windings, it oftentimes obliged them to follow a course opposite to that which they had intended to pursue, nevertheless enabled them, by adhering to it closely, eventually to penetrate to a distance of twenty-five geographical miles, *due west*, from the Nepean River, to a terminating *point* in those mountains. After having traversed a bleak and dreary waste, by a route exceeding fifty miles in length, it may be readily conceived with what joy these laborious travellers beheld, from the rugged brow of this precipice, a grassy, well-watered vale, which appeared to extend some miles to the westward,—a failure of provisions, however, obliged the party to retrace their steps back to the colony. On this occasion, their example being followed up by Mr. W. Evans, Assistant Surveyor, by order of the Government, that fine pastoral country, the Downs of Bathurst, and the rivers Macquarie and Lachlan, were shortly afterwards discovered. During the following year (1814) a practicable line of road was constructed, by convict labour, over mountain-ridges, which in some parts have been since ascertained to be three thousand four hundred feet above the level of the sea; and thus was thrown open that extensive range of sheep and cattle pasturage, which has since been of such immense value to the colony.

The encouraging results which attended this enterprise, naturally suggested the propriety of sending an expedition to explore the newly-discovered streams, which, although they were nearly eighty miles asunder at the points where they were first met, it was nevertheless expected would be found to unite in the interior, and

become a river of considerable magnitude, running to the sea. The late Surveyor-General, Mr. Oxley, was accordingly dispatched, in the winter of 1817, to trace, in the first place, the course of the Lachlan; and, having myself just arrived in the colony, I most gladly accepted an invitation to join, under so able and intelligent an officer, the first expedition which was undertaken for the purpose of exploring the interior of the Australian continent.

The River Lachlan, as will be remembered, was followed by the party through a flat inhospitable country, and so far from its forming a junction with the Macquarie, it was found not to receive even a single tributary stream in any part of its long and tortuous course, which, with great patience and perseverance, Mr. Oxley explored beyond the westernmost range of hills to an interior, a dead level, forming a chain of plains, which appeared alone bounded by the horizon—their ample surface bearing the very evident proofs of being, in seasons of continued rains, extensively inundated. Over these Australian *steppes*, which were not more than two hundred and fifty feet above the level of the sea, Mr. Oxley pushed his way westerly, in his further examination of this river; and, notwithstanding the slimy nature of their surface, and the distressed condition of his horses, he was, nevertheless, enabled to continue his journey upwards of one hundred miles to the westward of the last rise or hill-like undulation of that part of the interior, before his progress was arrested by extensive and impassable morasses, the river (if worthy of the name at that extremity of his journey) having divided itself into several small channels, and its water having become perfectly stagnant, and unfit for use. This termination of the labours of the expedition, westerly, occurred in longitude 144½° E.; and during the stay of the party at that remote station, besides the many astronomical observations which were taken to determine its position, the rising amplitude was observed, as at sea, which gave 7° 25′ easterly variation. Of the extent of those vast levels the party could form no just idea. In the direction in which the expedition had proceeded down the river, namely, from N.E. to S.W., a chain of plains, destitute of trees, extended for upwards of one hundred and thirty miles; and, at right angles with that line of bearing, namely, from N.W. to S.E., the flat country appeared alone terminated by the horizon. Still, however, it must be observed, that where the mind and the sight are alike fatigued by the monotonous character of the view around, the traveller naturally becomes impressed with the idea that the extent of the open country he is traversing, is far greater than it is in reality.

With a reduced stock of provisions, and at a distance of more than four hundred miles inland from the colony, Mr. Oxley com-

menced his journey homeward, little thinking, that could he have penetrated but twenty miles farther to the S.W., he would have arrived at the Morrumbidgee River, at that time not known in any part of its course, and only recently ascertained (although long supposed) to receive the drainings of the Lachlan Marshes. It may here be worthy of remark, that, in retracing their steps over those wet unhealthy levels to the hills which skirted them on their eastern side, Mr. Oxley and his party repeatedly witnessed, in the morning before the sun had risen many degrees above the horizon, the singular appearance of the *mirage*, or the extraordinary effect of refraction upon those apparently unbounded plains. In one direction they beheld, with surprise, the few straggling trees, the line of which separated one expanse of plain from another, with their rounded heads suspended in the air, being apparently separated from their trunks by a watery medium; whilst in another were distinctly traced, on the verge of the distant horizon, an outline of hills, with pointed or conical summits, and bluff precipitous terminations. These, however, had no actual existence; for, no sooner had the day advanced, than the cones became truncated—the aërial ridge began to break and dissolve, and the whole soon afterwards disappeared. After a severe march of six days, the travellers regained the rising grounds, and crossing the Lachlan with some difficulty, by means of a raft, they quitted that turbid stream altogether, which had become suddenly swollen by floods from the eastward. The party now shaped a more northern course homewards, than they otherwise would have done, in hopes of meeting with the long-lost Macquarie River, which they had not seen since they quitted Bathurst, the downs of which it waters. All travellers, in exploring new tracts of country, are subjected more or less to sudden vicissitudes: in this expedition to trace the source of the Lachlan, these were numerous, and oftentimes of a distressing character. The simple mention of one of these changes, arising out of the circumstances of the country, may here suffice. Five weeks were employed in traversing those steppes over which the waters of the Lachlan are dispersed, and on no one occasion, during that period, did the party meet with a dry spot, on which to encamp at the close of the day. On the contrary, comfortless as it really was, still, having been for sometime accustomed to accommodate themselves to circumstances, they cheerfully sought repose from the fatigues of the day, upon any part of those wet plains, where exhaustion, and the approaching night, had obliged them to halt.

On leaving the right bank of the Lachlan, however, Mr. Oxley entered on a country, in point of character, the very reverse of that which he had recently quitted. For nearly a hundred miles the expedition had to encounter those privations, which are inevi-

table in a tract of country, where, from extreme sterility, neither water nor pasturage for the horses could occasionally be found; and where the surface, although somewhat elevated above the low plains, which the travellers had just left, being, for a considerable extent, of a light, red, sandy soil, was only capable of producing a scrubby vegetation, alone interesting to the botanist. At length, however, upon passing to the eastward of those arid regions, they reached a better country, and one that improved daily as they advanced. Hills lightly wooded, and grassy to their very summits, appeared before them: these were found to furnish springs, which formed small rivulets in the adjoining valleys, in one of which, of considerable extent and romantic appearance, to which the name of Wellington was given, they found, with no small satisfaction, a river, flowing silently to the N.W. This was the Macquarie, so long the object of their search. The discovery of this river, at a distance of one hundred miles to the north-west of Bathurst, in a measure recompensed the travellers for all their toils on the Lachlan; and Mr. Oxley's report of it to the local government, inducing the hope that it would, when increased by other tributary streams, find its way to the sea, a new expedition was directed, in the winter of the following year, to explore it downwards from Wellington Valley.

Great expectations were entertained from this second expedition, and the disappointment, therefore, was severe, when the Macquarie was traced to a low marshy interior, in a north-westerly direction; where the hills again disappeared, and the country becoming 'perfectly level,' the flooded river eluded further pursuit, by spreading its waters far and wide, between the compass-points of N.W. and N.E. This expanse of shoal water our indefatigable Surveyor-General explored in a boat, amidst reeds of such height, that having at last 'totally lost sight of land and trees,' he was obliged to return to the party which he had left encamped on Mount Harris —a detached hill on the river's bank, elevated about two hundred feet above the plane of the neighbouring flats. Having thus followed the Macquarie also to a reedy morass, of apparently unbounded extent, beyond which (in a westerly direction) it was, at that period, perfectly impossible to penetrate, Mr. Oxley determined (with such means as he had at command) to prosecute his discoveries easterly, in the parallel 31° 15′, in which latitude his examination of the river had terminated. In that most arduous portion of his journey, he encountered numerous difficulties before he was fully enabled to emerge from the marshes, to firmer and more elevated grounds. In his progress easterly, Liverpool Plains, and a hilly, picturesque, and well-watered country were discovered, and he reached the coast at Port Macquarie, in 31½° S. latitude;

from which the expedition returned southerly along shore to Port Jackson. Highly important to the colony as were these acquisitions to its geographical knowledge, still the result of the last researches, respecting the termination of the Macquarie, seem, for a time, to have damped the ardour of the Colonial Government for further discoveries in the interior.

Up to that period, (1819) the colonists knew nothing of the southern country, beyond the cow-pastures, where that extensive patch of thicket, called the 'Bargo-brush,' formed a boundary, which had not been penetrated. At length, about this time, both that and the Wombat-brush, in Argyle, were passed, and a third river flowing inland, and called by the aborigines 'Morrumbidgee,' was discovered. Minor excursions were immediately afterwards made by individuals into that interesting country, where many fine tracts of land were found, which have since proved of great value to the grazier. It was not, however, until the winter of 1823, that an extensive tract of undulated country, clear of timber, and watered by the Morrumbidgee, was discovered by a party, conducted by an officer of the navy, at a point nearer to its source than had before been seen. This open country, which was named, upon its discovery, 'Brisbane Downs,' the travellers learnt from a tribe of natives was called in aboriginal language, 'Monaroo;' and its extent was described by the Indians as very considerable. These fine sheep-walks were ascertained, by accurate observations, to lie immediately to the eastward of the meridian of 149°, and were found to extend upwards of forty miles to the southward of the parallel of 36° 15′, which appears to be the latitude of their northern skirts. They are further described as being bounded on the east by the coast range of hills, which give an interior direction to the course of the streams, by which they are permanently watered; and on their western side, by those lofty mountains, now known by the native name Warragong.

The elevation of Brisbane Downs, above the sea-shore (distant from them to the eastward about seventy miles), although it has never been measured, cannot be less than two thousand feet; and as they are in higher latitude than other portions of land, within the present boundaries of the colony, the climate may probably be found more congenial to the growth of wool and the constitution of sheep, than that of those extensive tracts of pastoral country, from which the colonists are annually obtaining so many thousand fleeces for the English market. The mean height of any one point of the great Warragong Chain, which appears to extend without interruption to Wilson's Promontory (the southernmost extremity of the Australian continent), has not yet been determined. That portion, however, of what may be called the backbone of

the country, is, probably, of greater elevation above the level of the ocean than any other * range of mountains along the eastern coast, either within or beyond the tropic, since its summit is not simply covered with snow during the winter months, but has been seen perfectly white at other seasons of the year.

At the same time that these important geographical researches were carrying on in the southern parts of the colony, I was occupied with a party in the elevated country on the north of Bathurst, in which direction, at a distance of fifty miles from that settlement, the Cudgeegong, a tributary to the Macquarie, had been previously discovered, and stock stations erected on its banks.

In my excursion through that mountainous country, I succeeded not only in effecting a clear, well-defined route for the grazier to Liverpool Plains from Bathurst, but also in bringing the settlers of the latter district in direct communication with those farmers, who had taken their lands on Hunter's River.

The year 1824 had nearly passed away without the smallest addition being made to the knowledge already acquired of the interior country to the south of Port Jackson. Towards its close, however, Messrs. Hovell and Hume, two enterprising agriculturists (and the latter a native of the colony, possessing a considerable local knowledge), undertook a journey in a south-westerly direction from Argyle, with the design of reaching the sea-coast near Bass' Strait, and of ascertaining the nature of the intermediate country, of which the colonists, at that time, knew absolutely nothing. In their outfit for such an arduous excursion, the Colonial Government afforded but a partial assistance. Their more perfect equipment was derived from their own farms; and the results therefore of their tour claimed for them, very justly, the greater share of merit. Our travellers took their departure from a stock-station near Lake George, with the intention of pursuing a direct course to the south-west. This line of route, however, led them into great and insurmountable difficulties, for they soon found themselves entangled in a range of mountains connected with those of the Morrumbidgee, through which they could not possibly penetrate. They, however, soon perceived, that the only way by which they could extricate themselves and cattle from

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* Whilst engaged at Moreton Bay (to the north of Port Jackson), in the winter of 1828, I peretrated to the base of a range of mountains bearing S.S.W. about sixty miles from that penal settlement.

The principal summit of that range, which was named at the time 'Mount Lindesay,' I ascertained, by trigonometry, to be four thousand seven hundred and fifty feet above the plane of the country on which it stood, and the spot I had encamped on; and this latter I found, by the mean of several barometrical observations, to be nine hundred and fifty-three feet above the shores of Moreton Bay: thus making the mean height of 'Mount Lindesay' five thousand seven hundred feet above the level of the sea,—an elevation by far the most considerable that has been measured and ascended by Europeans in that country.

their difficulties, without being absolutely obliged to retrace their steps to the point whence they had originally set out, was to proceed, in the first instance, more to the westward, before they attempted to make any southing. This they effected without material injury to their burdened cattle, and having passed to the westward of the meridian of 148°, they found no further impediments in their route to the south-west, having broadly on their left hand, or a little to the eastward of them, the great Warragong Chain. In latitude 36°, the party crossed a river, which derived its source from those snow-clad mountains, and was flowing with considerable rapidity among the hills towards the north-west. To that stream, which, in consequence of its depth and width, (exceeding one hundred yards,) they had some difficulty in passing, they gave the name of 'Hume.' Their journey was now conducted through a fine, open, thinly-timbered country; its surface was, for the most part, hilly, or moderately undulated, and occasionally, to diversify the scene, there broke upon the view a patch of plain, without a tree, but abundantly clothed with a grassy vegetation. This pastoral country was found, even in the summer months, well watered by streamlets from the hills around, the waters of which, collecting, had formed a second river, to which our travellers gave the name of 'the Ovens,' upon fording it in latitude 36° 40′. This was described as being of less magnitude than the Hume, but its stream was of equal velocity, and the direction given it by a break in the hills, and the apparent inclination of the country, was also to the north-west; in which bearing, wherever a commanding position on the hills afforded the party a view, a declining wooded country was observed, with scarcely a single elevation.

Southerly, the land continued equally good, but rising in altitude, presented a more broken, irregular surface to our travellers, who, however, patiently surmounting the difficulties which lay in their way, at length came to a third stream, to which they gave the name of 'Goulburn.' This river, which was formed by a junction of several streamlets, which came from the hills to the eastward, ran southerly in the direction of the course pursued by the expedition as far as latitude 37°, when it also took a decided bend towards the north-west.

The exploring party now passed the meridian of 146°, and beheld before them the coast range of hills. This proved to them a source of no small encouragement to continue their journey, for they had began to despair of reaching the sea-coast, in consequence of the exhausted condition of their burdened beasts, and of the loss which they had sustained in their stock of provisions, by accidents and the great heat of the weather. A beautiful country, however, appeared before them, and as it exhibited an alternation of plain and woodland of like interest, as affording an unlimited range of

sheep and cattle pasture, they had the more inducement to pursue their route to the southward cheerfully; and this they did until at length they reached salt water and a sandy shore.

On the 16th of December of the above year, Messrs. Hovell and Hume arrived at the northern shore of what they considered Western Port, notwithstanding they looked in vain for the large island, which the charts show us lying within it. This was, however, their mistake; for, without being aware of it, they had actually effected more than had been originally expected of them, for they had made the north-eastern side of Port Phillip—a large bay on the south coast, half a degree to the westward of the point at which they had supposed themselves at the time to have arrived. Of this fact the late Mr. Oxley was assured, when it was seen that their report of the extent of the Port they had made on the coast, and the country to the northward of it, agreed so fully with what was known of both from the year 1803; when Port Phillip was visited by Mr. Charles Grimes, at that time surveyor-general, who was sent to survey the harbour more minutely than either Captain Flinders or the discoverer of it, Lieutenant John Murray, R.N., were enabled, in the preceding year, to effect.

In their journey back to the colony, which they immediately commenced, Messrs. Hovell and Hume pursued a line of route altogether to the westward of their outward-bound track; and thus, by travelling on a much lower level, avoided entirely that broken hilly country, which had proved so harassing to their cattle in their former journey.

The extent to which this line of country will, doubtless, be ere long occupied by the colonists, may be understood by describing it as stretching south-westerly from 35° of latitude to the shores of Port Phillip in 38°. The boundary, on its eastern side, is a diagonal line, drawn from the meridian of 149°, as it passes the parallel of 35°, to longitude 145½°, cutting the latitude of 38°; as that line will, most probably, intersect the bluff terminating points of ridges, forming abutments against the great eastern chain: whilst its western limit may be defined by another diagonal line continued from about 147°, where the parallel of 35° passes it, until it meets the meridian of 145°, in latitude of 37°. The local knowledge of which we are now in possession, induces us to view it as extremely probable that, with the exception of any narrow belts of alluvial land which may extend along the immediate banks of the three rivers discovered by these travellers, a great extent of low steril region exists to the westward of the last-mentioned line of limitation, being, probably, a continuation of that arid desert which is shown on Mr. Oxley's chart, lying between the parallels of 33° and 35°, and under the meridians of 146° and 147°,—a country literally a perfect waste, entirely destitute of water at any

season, if we except those small quantities of rain which occasionally fall and are caught in the shallow excavations of sandstone rocks on the ridges, from which alone the party of the expedition of 1817 derived their scanty supply, after quitting their boats on the Lachlan River.

To that valuable tract of country, first laid open to our view by the above-mentioned indefatigable persons, the attention of future emigrants will, doubtless, be directed; since, from the fact of its being bounded immediately on the east by the Warragong Chain, no doubts can be entertained of its being found, when occupied, far better watered than the country already located, and less liable to the effects of those droughts which have so frequently distressed the northern parts of the colony,—its higher southern latitude giving it, as a further recommendation, a cooler climate and one which more resembles that of England.

With the exception of my examination of the western and northern sides of Liverpool Plains in the month of May, 1825, which enabled me to furnish something more than what had been previously known of those extensive levels, our stock of geographical knowledge received no accession during either that or the following year. The year 1827, however, a new scene opened to the colonists; for a journey which the late Mr. Oxley had himself at one period contemplated, was determined on, viz., to explore the entirely unknown country, lying on the western side of the dividing range, between Hunter's River in latitude 32° and Moreton Bay in latitude 27° S. For this purpose a well appointed expedition, equipped fully for an absence of five months, was placed by the Colonial Government under my direction.

On the 30th of April, of that year, (1827,) having provided myself with the necessary instruments,* and with an escort of six servants and eleven horses, I took my departure from a station on an upper branch of Hunter's River, and upon crossing the dividing range to the westward, at a mean elevation above the level of the sea of three thousand and eighty feet, I pursued my journey northerly, through an uninteresting forest country, skirting Liverpool Plains on their eastern side. As it is my intention to lay before the public, erelong, a narrative of this journey, which, in consequence of the long drought by which this part of the country had suffered, cost my party no ordinary exertions, I trust that an outline of it will now be sufficient.

On the 11th of May, we crossed (in latitude 31° 2′) Mr. Oxley's track easterly towards Port Macquarie in 1818, and from that point the labours of the expedition commenced on ground previously untrodden by civilized man. It was my original design to

* Among these instruments was an excellent portable mountain-barometer by Jones, which, by care, I succeeded in carrying throughout the journey uninjured.

have taken a fresh departure to the northward, from the point at which the late Surveyor-General had passed the river named by him the 'Peel,' upon our reaching the above-mentioned parallel, and which bore from a spot on which we had encamped, due east about twelve miles: however, the intermediate country, although Mr. Oxley had passed it, proved too elevated and rocky for my heavily-burdened horses; and I was, therefore, obliged to continue the course of the expedition to the north under the meridian of our tents, (viz. 150½°,) being well aware that as the final course of that river was towards the interior, we should cross its channel whenever the chain of lofty hills which bounded us on the east, and which appeared to stretch far to the north, should either terminate or become so broken as to allow of its escape through them to a lower level. Thus we continued our journey to the north through a barren, but densely-timbered country, of frequently brushy character, and altogether very indifferently watered. Each day as we advanced, our barometer showed us that these poor forest-grounds, which, to add to the difficulty of penetration, were occasionally traversed by low arid ridges of argillaceous ironstone and clayslate, rose in elevation from the low level of the northern margin of Liverpool Plains, which I found to be only eight hundred and forty feet above the level of the sea. This rise of surface was, however, most gradual; for, after a march of forty miles directly to the north, we found on reaching the bank of a small stream, a branch evidently of the Peel, that we had attained but a mean height of one thousand nine hundred feet above the sea-coast—an elevation which was too inconsiderable to produce any obvious change for the better, either in the growth of the timber, the nature of the soil, or of the scanty herbage. Through those gloomy woods, with scarcely a trace of either Indian or kangaroo, we patiently pursued our way until the 19th of May, when, upon passing the parallel of 30°, we descended from some stony hills to the head of a beautiful well-watered valley, affording abundance of the richest pasturage, and bounded, on either side, by a bold and elevated rocky range. This grassy vale we followed northerly about sixteen miles to its termination at the left bank of a large river, which, in seasons less unfavourable to vegetation, appeared evidently a stream of considerable magnitude. This was the Peel of Mr. Oxley; which, after pursuing its course to the north for upwards of a degree of latitude from the point at which that officer had passed it in 1818, had at length forced its passage through a break in the eastern ranges, and, passing the lower extremity of the valley in latitude 29° 51′, flowed on towards an open country observed beyond it at north-west. So considerable was the dip of the vale, along which our route had extended, that we found ourselves in the channel of this river,

again nearly on the level of the northern or lower sides of Liverpool Plains—the mean of the results of our morning and evening observations of the barometer giving us only nine hundred and eleven feet. The channel of the Peel, which, at this period, exhibited a bed of gravel two hundred and fifty yards in breadth, is, in seasons of long rains, entirely filled by floods to the depth of twelve and fifteen feet, as was obvious from the marks of those freshes on the upper banks. The long continuance of dry weather, which had alike distressed the colony and these distant parts of the interior, had, however, reduced its stream to a mere rill, which we forded without difficulty. Passing the channel of this river, by which a considerable tract of broken mountainous country to the S.E. is drained, we resumed our journey to the north, between the meridian of 150° and 151°. Our course led us through a variety of country; for, on quitting the river, we traversed a barren, brushy tract, which extended more or less for fourteen miles; beyond, however, the land materially improved, and as it was less encumbered with small timber and more open to the action of the atmosphere, a considerable growth of grass was produced. A succession of open forest hills of moderate elevation, and narrow intermediate valleys, with an occasional patch of plain, of a good soil, characterised the line of country, which the expedition afterwards crossed; and although the land (the mean elevation of which did not exceed eleven hundred feet) was, generally speaking, rich, and productive of much grass, it was, nevertheless, distressing to meet with tracts, many miles in extent, entirely destitute of water. Traces of the natives were frequent, although not of recent date. We met, however, with neither the wandering Indian nor any description of animal, for the parched state of vegetation and the distressed condition of the country generally, had evidently driven both to other parts of the interior, where the means of sustaining life were less precarious, or, at least, where a permanent supply of water, although it might be in a stagnant state, was to be obtained. Hitherto our view towards the west had been circumscribed by a continued chain of thinly-wooded ridges, which had extended, northerly, parallel to the course we were daily pursuing. On reaching the latitude of 29° 10′, which we did on the 25th of the month, all the hills to the westward of our line of route terminated, and a level, open interior, of vast expanse, bounded on the north and north-west by a distant horizon, broke suddenly on our view! At north-west, more particularly, it was evident to all of us that the country had a most decided dip, and on that bearing, the line of sight extended over a great extent of densely wooded, or brushed, land, the monotonous aspect of which was here and there relieved by a brown patch of plain: of these some were so remote as to appear a mere speck on the *ocean* of land before us, on which the

eye sought anxiously for a rising smoke, as indicative of the presence of the wandering aborigines; but in vain: for, excepting in the immediate neighbourhood of a river of the larger magnitude, these vast solitudes may be fairly said to be almost entirely without inhabitants. We had now all the high grounds on our right hand, or to the east of us, and before us, at north, a level, wooded country. With an anxious curiosity to explore so extraordinary a region, we continued our route on the 26th of May, from a rocky creek, where we had rested upon some tolerable pasture. Our elevation above the sea-shore, we found by our barometer to be one thousand two hundred and twenty-eight feet, and we soon discovered that we had entered a barren waste, over which was spread a loose sand, (the debris of the prevalent rock formation of the eastern hills,) which gave it a desert-like aspect. A blighted kind of the iron-bark tree, (apparently Eucalyptus resinifera,) scarcely twenty-five feet high, clothed its surface, on which were here and there interspersed dense patches of underwood, composed of plants formerly observed on the western skirts of Liverpool Plains. In this stage of our journey we crossed the parallel of 29°, in about the meridian of 150° 40′; and having very little expectation of meeting with water, in any state, in so arid a region, we were most agreeably surprised to find the channel of a river from eighty to one hundred yards in width, winding its course to the westward. This stream, which received the name of Dumaresq's River, although greatly reduced by drought, presented, nevertheless, a handsome piece of water, half a mile in length, about thirty yards in width, and evidently very deep. My barometer, which I set up on the gravelly bed of the river, gave me only eight hundred and forty feet of elevation above the sea-coast, from which we were distant to the westward about one hundred and seventy English miles.

It was my full intention to have continued my course in the direction of the meridian, at least to the parallel of 27°, before I made the least easting towards the coast-line; this design, however, the existing circumstances of the country we had penetrated compelled me to abandon; for the great debility to which the whole of my horses were reduced, by the labours of the journey through a line of country parched up by the drought, at once obliged me to pursue a more eastern course; in which direction, upon gaining the higher lands, I could alone expect to meet with a better pasture, than that on which they had for some time subsisted.

On our new course to the northward and eastward, we had to struggle through a desert waste for many miles, before we gained a more undulated surface to the eastward of 151°, when the country through which we journeyed for about thirty miles, presented a

succession of thinly wooded stony hills, or low ridges of sandstone rock, separated from each other by narrow valleys, in which my half-famished horses met with but scanty subsistence. At length, on the 5th of June, having gained an elevation of about nine hundred feet above the bed of Dumaresq's River, we reached the confines of a superior country. It was exceedingly cheering to my people, after they had traversed a waste oftentimes of the most forbiddingly arid character, for a space, more or less, of eighty miles, and had borne, with no ordinary patience, a degree of privation to which I had well nigh sacrificed the weaker of my horses—to observe, from a ridge which lay in our course, that they were within a day's march of open downs of unknown extent, which stretched, easterly, to the base of a lofty range of mountains, distant, apparently, about twenty-five miles. On the 6th and following day, we travelled throughout the whole extent of these plains, to the foot of the mountains extending along their eastern side, and the following is the substance of my observations on their extent, soil, and capability.

These extensive tracts of clear pastoral country, which were subsequently named Darling Downs, in honour of his Excellency the Governor, are situated in, or about, the mean parallel of 28° S., along which they stretch east, eighteen statute miles to the meridian of 152°. Deep ponds, supported by streams from the highlands, immediately to the eastward, extend along their central lower flats; and these, when united, in a wet season, become an auxiliary to Condamine's River—a stream which winds its course along their south-western margin. The downs, we remarked, varied in breadth in different parts of their lengthened surface: at their western extremity they appeared not to exceed a mile and a half, whilst towards their eastern limits, their width might be estimated at three miles. The lower grounds, thus permanently watered, present flats, which furnish an almost inexhaustible range of cattle pasture at all seasons of the year—the grasses and herbage generally exhibiting, in the depth of winter, an extraordinary luxuriance of growth. From these central grounds, rise downs of a rich, black, and dry soil, and very ample surface; and as they furnish an abundance of grass, and are conveniently watered, yet perfectly beyond the reach of those floods, which take place on the flats in a season of rains, they constitute a valuable and sound sheep pasture. We soon reached the base of some hills, connected laterally with that stupendous chain of mountains, the bold outline of which we had beheld with so much interest during the three preceding days. These hills we found clothed, from their foot upwards, with an underwood of the densest description, in the midst of which, and especially on the ridges, appeared a pine, which I immediately discovered to be the same species as that observed in 1824, on the

Brisbane River. Encamping, I ascended a remarkable square-topped mount, which formed the western termination of one of these ridges; and from its summit had a very extensive view of the country lying between north and south, towards the west. At N. and N.N.W. we observed a succession of heavily-timbered ridges, extending laterally from the more elevated chain of mountains, immediately to the east, which evidently forms the main dividing range in this part of the country; whilst from north-west to west, and thence to south, within a range of twenty miles, a most beautifully diversified landscape, made up of hill and dale, woodland, and plain, appeared before us.

Large patches of land, perfectly clear of trees, lying to the north of Darling Downs, were named Peel's Plains, whilst others, bearing to the south and south-east, and which presented an undulated surface with a few scattered trees, were called after the late Mr. Canning. Directing our view beyond Peel's Plains to the north-west, an expanse of flat, wooded country met the eye, being evidently a continuation of those vast levels, which we had frequently observed, in the progress of our journey, extending to the westward of our line of route, and which, it was now perceived, were continued northerly at least to the parallel of 27°.

In a valley which led to the immediate base of the mountain-barrier, I fixed my northernmost encampment, determining, as I had not the means of advancing further in consequence of the state of my provisions and the low condition of my horses, to employ a short period in a partial examination of the principal range, to the western base of which we had penetrated from the southward, through a considerable portion of barren interior. In exploring the mountains immediately above our tents, with a view more especially of ascertaining how far a passage could be effected over them to the shores of Moreton Bay, a remarkably excavated part of the main range was discovered, which appeared likely to prove a very practicable pass through these mountains from the eastward. Its more particular examination, however, I left to the period of a visit, by sea, to Moreton Bay, which I had already contemplated, and which I was enabled to effect in the course of the succeeding year (1829). And the brief notice of my having thus, in a most satisfactory manner, connected my sketch of the Brisbane River country with this pass, and with the lands to the westward, will be seen in another part of this paper.

The situation of my tents in the valley was determined to be as follows. Latitude, by meridional altitudes of the sun being the mean of five observations, 28° 10′ 45″ south. Longitude, by account corrected by bearings taken to fixed points on or near the coast-line, and compared with the mean results of several sets of distances of the sun and star antares from the moon, 152° 7′ 45″ E.

The variation of the compass was found by azimuths to be 8° 18′ E. The mean height of the spot above the level of the sea, by the mercurial column noted morning and evening, was one thousand eight hundred and seventy-seven feet; and its distance from the penal settlement on the Brisbane River, which bore by compass about north-east from us, was estimated at about seventy-five statute miles. Circumstances now urged me to commence my journey homewards, and this I determined to prosecute with as much despatch as the condition of my horses and the nature of the country would admit of. I had also resolved to pursue my course to the southward, under the meridian of our encampment, as that would lead us through a tract of perfectly unknown country, lying nearly equidistant between our outward-bound track and the coast-line.

On the 16th of June, therefore, I again put my people in motion, and quitting the vale in which we had rested, (and which I had named after the late Captain Logan, at that period commandant of Moreton Bay,) I shaped my course to the southward; and after passing through a fine, open, forest tract, abounding in excellent pasturage, in nine miles gained the north-eastern skirts of Canning Downs, of which I had had a view from a station on the hills which we had left.

At the close of the 18th, after penetrating an uninteresting forest, chiefly of red gum (*Eucalyptus robusta,*) we reached the borders of a broken mountainous country, which exhibited a geological structure, that had not been previously met with in any part of our journey. The rock was a very hard granite, in which the quartz, greatly preponderating, was unusually large; and at this stage of our homeward-bound journey our difficulties commenced. During the succeeding week, our daily journies were attended with great fatigue both to my people and horses; for being surrounded by high lands, we had no alternative but to pursue our way southerly, from one rocky range to another of greater elevation; until at length we found ourselves upon an open heath, totally devoid of trees, but covered with a low, scrubby vegetation, and interspersed with small patches of spongy swamp, in aspect similar to parts of the Blue Mountains to the westward of Port Jackson. And although the base continued of granite, and the difference of latitude was nearly 5°, yet the same species of plants as are to be observed upon those elevated ranges of the colony were, for the most part, to be found. At noon of the 25th, our latitude, observed on a very bleak sterile spot on those mountains, (two thousand nine hundred and sixty-nine feet above the sea-shore,) was 28° 45′ S., and our longitude reduced from the meridian of our encampment in Logan Vale, was about 151° 59′ E. From that point, notwithstanding our elevation, our view towards the east was alto-

gether circumscribed by lofty ranges, whose summits towered far above the height we had attained. In the course of the succeeding day, the progress of the expedition to the south was arrested by a most wild and frightful region, which obliged me at once to seek a more practicable country, by directing the course of my party to the westward, in which direction we, with difficulty, gained a lower level, and thence prosecuted our journey to the south-west, by such stages as the reduced strength of my horses was able to accomplish. On passing to the southward of the parallel of 29°, which we did in longitude 151° 32′ E., we again forded Dumaresq's River about fifty miles nearer its source, or to the eastward of the point at which we had discovered it on our outward-bound journey. Here our barometer gave us an elevation of one thousand and forty feet above the level of the sea, which showed a mean fall of four feet per mile, between the two fords.

On the 9th of July, after having traversed in a south-western direction a great diversity of country, in general of broken, rocky surface, we fell in with our former track, and on the following day crossed the channel of what I had considered the Peel, but which I subsequently named the Gwydir, upon finding it formed by a junction of Mr. Oxley's River with another as large, to which I gave the title of Horton's River. This latter has a course parallel to the Peel, through a valley lying to the westward of it, along which I was again enabled to direct my party to the south many miles, before a series of elevated forest ridges, stretching laterally from Hardwicke's range of Mr. Oxley, once more obliged us to climb the hills. These we ascended from the head of the vale, by a steep acclivity, and, at an elevation of one thousand three hundred feet above its level, resumed our course to the south. Among these hills we again observed granite, but of a reddish appearance, in consequence of the quantity and colour of the felspar which might be seen disseminated through the rock, of which Hardwicke's range is evidently formed; the elevation, above the level of the sea, of whose curiously formed cubical and chimney-shaped summits cannot be less than three thousand five hundred feet. The vegetation of this group of hills exhibited nothing remarkable; the ridges were generally grassy, but the *gramineæ*, as well as the timbers, which were of *Eucalyptus*, were of species frequent in the colony. At the close of our second day's journey, we had traversed these lateral ranges to their southern side, which overlooked an apparently level, wooded country, extending to Liverpool Plains, the greater body of which at length appeared before us to the south-west, at a distance of forty miles. Repeatedly, in our attempts to descend to the lower country, were we stopped by rocky ravines several hundred feet in depth; and it was not without considerable difficulty and danger to the horses that we gained the levels beneath

us, having actually descended a wooded ridge, from which there was an abrupt declivity of one thousand five hundred and forty feet. After a severe march of thirty miles through a barren forest, for the most part of blighted Iron-bark, furnishing but little pasturage and still less water, we at length arrived at Barrow's Valley of Mr. Oxley, which, in seasons of long rains, is evidently laid under water by the overflow of Field's River, which, in its course inland, we met meandering north-west, through the adjacent forest. On the bank of this river, where I gave my horses a day's rest upon the richest meadow-land we had seen in the whole tour, it was with pleasure that I hailed the colonial blue gum (*Eucalyptus piperita*) of stupendous size, the alluvial grounds on each bank producing also the herbage of the flooded flats of the Hawkesbury River in the colony. On the 20th of July, we resumed our route to the southward, and after pursuing a steady course for about twenty-seven miles through a barren, brushy country, not nine hundred feet above the level of the sea, we passed the northern margin of Liverpool Plains, throughout which, such had been the effect of drought, that we crossed their extensive surface almost to the foot of the dividing range (a space of twenty-five miles) before we found water for the horses or ourselves. On the 28th my party repassed the Mountain Range, and after an absence of thirteen weeks, we returned to the station from which we had departed, on the Hunter, having, in that period, traversed upwards of eight hundred miles of every description of country.

My report to the Colonial Government of this journey—of the spacious downs we had discovered in latitude 28°—and the considerable tract of very indifferent country, in part actual desert, that lay between the colony and those extensive pastoral lands, immediately suggested the importance of examining the space between those downs and the sea-coast at Moreton Bay; since, should the Gap, which had been discovered in the main dividing range in the above parallel, prove, on actual survey, to admit of a passage through that chain of mountains, the readiest point of access to the very desirable country on their western side would be from the shores of Moreton Bay and Brisbane River,—on the banks of the latter of which a penal settlement had already been established for several years. This inquiry became one of the objects of my voyage from Port Jackson the following year; and its results proved every way most satisfactory to the colonial government, and the colonists generally.

As I propose to make some general remarks elsewhere on the character of the country around Moreton Bay—a country alike interesting to the botanist and geologist—I will here simply remark, that in exploring the intermediate tract between the Brisbane River and the point where my overland journey of the pre-

ceding year had terminated, I ascertained that a line of road could be easily constructed from the western downs, easterly through the mountain pass, and thence in a north-eastern direction to the head of the navigation of a branch of the Brisbane River, named the Bremer; to which point evidently the future produce of the interior beyond those mountains will be conveyed, since from it the means of water-carriage to shipping in the bay will be found practicable at all seasons of the year, whatever may be the effect of drought on the land; the tide, which daily sets into the Brisbane for fifty miles above its mouth, flowing also up the channel of the Bremer, the depth of water in which it augments eight or more feet.

I was happy on this occasion of my visit to the Brisbane River, with in part other objects in view, to be enabled to carry on my survey from Darling Downs to the very shores of Moreton Bay; and in effecting it, I derived an additional pleasure, in closing my sketch of an extent of intricate country, comprehending from Hunter's River to Brisbane Town, 5° of latitude, to find but a very small error in my longitude. In the winter of the following year, (1829,) I again made a voyage to Moreton Bay, where I was engaged more particularly in botanical research. From that most interesting occupation, in so novel and ample a field as the banks of the Brisbane River afforded me, I found a short period of leisure to devote to geographical inquiry; and, accordingly, in an excursion to the north-west, I explored that stream far towards its source, through an irregular country*, which presented much diversity of surface to interest the geographer. During that short journey, in which I employed a small party about six weeks, I traced the principal branch of the river as far north as latitude 26° 52', until its channel assumed merely the character of a chain of very shallow stagnant pools. In this excursion I made such observations as fully established two facts, *viz.*—That the Brisbane River, at one period supposed to be the outlet of the marshes of the Macquarie, &c., originates on the eastern side of the dividing range, its chief sources being in elevated lands, lying almost on the coast line, between the parallels of 26° and 27°; and that the main ranges, which separate the coast-waters from those that flow inland, continue to the north in one unbroken chain as far as the eye could discern from a commanding station near my most distant encampment up the river, and present no opening or hollow part in their elevated ridge, through which to admit of a

* One of the most remarkable points, in that particular tract of country, is a conical densely-wooded mountain, to which I gave the name of 'Hay's Peak,' in compliment to R. W. Hay, Esq., the Under-Secretary of State for the Colonies. It is situated on the eastern side of the dividing range in lat. 27° 36' S., and long. 152° 8' E.

road being made, to the interior beyond them. My pass, therefore, through those lofty mountains (the mean elevation of which above the shores of Moreton Bay cannot be less than four thousand feet) seems thus the only opening to the interior country from the coast between the parallels of 26° and 29° south.

Whilst I was engaged at Moreton Bay, the long droughts to which our distant colony has been repeatedly subjected since its foundation, and which again visiting that country in 1826, had continued with most distressing severity for upwards of three years, led the colonial government to inquire into the state of the interior, to the westward of the termination of the Macquarie River, with the view of attempting to make some discoveries in that quarter. Whilst the drought continued, an expedition was despatched under the direction of Captain Sturt, an officer of his Majesty's 39th regiment, to Mount Harris, a detached hill upon the Macquarie River, where Mr. Oxley had left his boats upon proceeding easterly towards the coast. Upon reaching that remarkable eminence, which Captain Sturt and the party forming his expedition were enabled to do on the 20th of December, he ascended the summit to survey the country below. But how much had the evaporation of the sun, which, in its operation, had continued during a period of three years, changed the face of those regions! The plains which Mr. Oxley had left entirely under water in 1818, now presented an expanse of dried up surface, which to all appearance extended northerly, without the slightest semblance of rising ground, to a distant 'clear unbroken horizon.' Encouraged by these appearances, the expedition traced the Macquarie, through the last stage of its existence, to the woodlands below Mount Harris, where its channel, becoming broken and in parts having altogether disappeared on the common level, ceased 'to exist in any shape as a river.' In exploring the country beyond this point, the party traversed the bed of that extensive morass, into which the late surveyor-general had ten years previously descended in his boat: this they now found 'a large and blasted plain, on which the sun's rays fell with intense heat;' the ground itself, parched to an extreme, exhibiting in many places deep and dangerous clefts, which clearly demonstrated the long existence of those droughts, to which every known part of New South Wales was at that period exposed. On these inhospitable levels, Captain Sturt passed a week; and in that period he skirted three distinct patches of marsh, in which were found broken channels of the river, forming so many stagnant lagoons or canals, surrounded by reeds.

In whatever direction they advanced to satisfy themselves as to the fate of the Macquarie, whether on the plains or wooded grounds, reeds of gigantic stature (the clearest indication of what

such a country is in a regularly wet season) encompassed them, and greatly obstructed their progress. Mr. Hume, whose enterprising disposition was abundantly manifested in his journey to the south coast, which has been already noticed in this paper, was associated with Captain Sturt on this occasion. With such aid, the latter proposed to divide the party, in order to undertake at the same time two distinct excursions, to ascertain more fully the nature and extent of those marshy flats, and set at rest any doubts which might be entertained as to the mode in which that river terminated—that is, of its non-existence in that low country, after the devastating operation of a drought of three years. Accordingly, one party, conducted by Mr. Hume, proceeded in a north-easterly direction, towards the Castlereagh, whilst Captain Sturt himself pursued a course to the north-west.

It would indeed have been most interesting, at this stage of the expedition, had Captain Sturt been provided with good barometers, to have ascertained the mean height above the level of the sea, not only of the lowlands over which the party had so patiently borne the burden and heat of the day, but also of the country which Captain Sturt traversed in his excursion to the north-west, and which he found, 'after travelling between twenty and thirty miles,' began to rise; also his level at the end of his journey, which was extended to an estimated distance of one hundred miles, where he '*made a hill of considerable elevation*,' from the summit of which he had '*a view of other high lands*;' one in particular to the south-west, which he describes as '*being a very fine mountain*;' and which he afterwards visited and found '*of sand-stone formation*,' elevated above the '*desert waste*' on which it stands, *one thousand three hundred feet*. Captain Sturt, however, had no barometer on which he could in the least depend; the instrument with which he had been provided on his quitting Sydney, having sustained an injury on the Macquarie, four days before the expedition reached Mount Harris.

The observations made during these short excursions, satisfied the party, that the river had no existence in any shape beyond the 'third marsh' previously explored. Mr. Hume passed from east to west, along the northern skirts of those extensive reedy flats, without either meeting with a further trace of a channel northerly, or finding water enough to supply his daily wants. And the character and direction of those vast flats, as well as the points to which the waters discharged upon them by the Macquarie in seasons of prolonged rains, tend, were now fully determined.

From the report of Captain Sturt's examination of those lowlands, then, affected as they were at the time by drought, these facts may be gathered. At a distance of about twenty-eight

miles below Mount Harris, the flat-lands commence, and there the Macquarie itself ceases to be a river, having no banks, or continued channel, by which to prevent the dispersion of its waters when they rise in rainy seasons. The surface of those flats, however, has not one continued dip, but presents a succession of levels and inclinations, with each a detached lagoon-like channel, hemmed in on all sides by high reeds which catch the waters as they spread; and it is only when these are overflowed that the floods spread over the level, 'until,' as Captain Sturt observes, 'a slight declivity giving them fresh impulse,' they arrive at a second channel, and so spread to a third, until a considerable extent of surrounding country is laid under water. When such a general inundation takes place, as that witnessed in 1818, there is a current through the body of these marshes, setting, agreeably to the configuration of the ground, (as at length shown to us by Captain Sturt,) to the north and north-north-east, where, uniting with the waters of Morissett's ponds, the whole is thrown into the channel of the Castlereagh River.

To the north-west of those marshy grounds, Captain Sturt describes the country as rising, and therefore preventing any flow of the waters of the morass to that point of the compass. This rise of the surface, which I observe is elsewhere described as 'a table-land with scarcely water to support its inhabitants,' may be clearly understood as meaning a series of low terraces of dry forest-land, which present a level tract of ground, or one but slightly undulated, extending, probably, a considerable distance, until a second rise of the ground takes place. And the extreme perpendicular elevation of such a tract above the plane of the marshes is far too inconsiderable to justify its being considered a rising hilly country; nor is its actual mean height above the level of the sea raised in the least, because it has been ascertained that there are upon its desert-like surface a few rocky hills, which, standing far detached from each other, appear, when viewed with the country surrounding the base of each, like so many islands in the ocean. This view of the face of the country bounding the marshes of the Macquarie on the north-west will assuredly be verified, whenever a barometer is carried to that part of the interior.

Finally, before I quit the subject of those low marshy grounds, which have excited so much interest and speculation among geographers since the report of them given by Mr. Oxley, I would briefly remark, that although a drought of unparalleled duration had disposed of their waters, so as to enable Captain Sturt and his party to traverse their bed in a dried up, hardened state, still, whenever a wet season sets in, and rain falls upon the mountainous districts

of that colony, in the same quantity that it did in the years 1817 and 1818, it can scarcely be doubted that a like considerable inundation will again take place in that part of the interior; and when it is considered (as Captain Sturt informs us) that a space, twenty miles in breadth, and more than fifty in length, is subject to be thus deluged, can it be a subject of surprise that the late indefatigable surveyor-general, when he descended in his boat to such an expanse of water, to which he could perceive neither boundary nor shore, should, with no previous knowledge of such a water, or of the features of the surrounding country, have conceived himself in the 'vicinity of an inland sea or lake,' of the temporary or more permanent existence of which he did not, nor could he have offered an opinion?

Captain Sturt now directed his expedition to the north-west, with a view to further discoveries, aware as he was, from the observations he had previously made during his own short excursion, that a clear open country was before him in that direction. In their route his party traversed plains 'covered with a black scrub,' yet furnishing in parts some good grass. The detached hills already spoken of, as relieving the otherwise monotonous aspect of that part of the interior, and in the neighbourhood of which Captain Sturt had directed his course, he describes 'as gentle picturesque elevations, for the most part covered with verdure.' Of two of these isolated spots, the one 'Oxley's Table Land,' the other 'New Year's Range,' it appears our indefatigable officer determined the positions; these were as follows—

Oxley's Table Land, lat. 29° 57′ 30″ S. long. 145° 43′ 30″ E.
New Year's Range . 30° 21′ 00″ 146° 33′ 30″.

In continuing their journey westerly over this level country, its total want of water, excepting in creeks where the supply was both bad and uncertain, became a source of considerable annoyance to the party; who ultimately were obliged to follow one of the water-courses, which, when tracing it to the north-west, brought them (on the 2d of February) to the left bank of a large river, the appearance of which 'raised their most sanguine expectations.' To the utter disappointment of the travellers, however, its waters were found perfectly salt; and this circumstance was the more severely felt, as the horses of the expedition had travelled long in an excessively heated atmosphere, and had been without water a considerable time. After making some arrangement in favour of his exhausted animals, Captain Sturt, accompanied by Mr. Hume, proceeded to explore this river, to which he gave the name of Darling. They followed it in the direction of its course (south-westerly), about forty miles, and throughout found its waters not only not drinkable, but rather becoming, as they advanced more

considerably impregnated with salt. In one part they observed 'brine-springs,' and the banks throughout were encrusted with 'salt,' or, probably, with aluminous particles. The breadth of the river, at the point they first made it, was estimated at sixty yards, and its boundary banks were from thirty to forty feet in height—dimensions which they maintained as far as it was possible to explore the river.

At length the want of 'drinkable water' along its bank, and the appearance of a loose red sandy soil, at the point to which the patience and perseverance of the travellers had induced them to trace the river, at once destroying all hope of meeting with the most scanty supply in the back country, obliged them to give up its further examination. The extreme point to which the Darling was traced, and from which it continued its course through a level country to the south-west, Captain Sturt marks on his map, in latitude 30° 16' south, and longitude 144° 50' east.

Thus was a portion of the interior of New South Wales, comprehending two degrees of longitude to the westward of the part to which Mr. Oxley had penetrated in the marshes, explored; and although the country is little better than a desert waste, and, therefore, can hold out no prospect of an advantageous 'extension of the colony in that direction,' its character, nevertheless, was ascertained, and so much of the map of the country, previously a blank, was at length filled up.

The expedition had daily intercourse with the natives who inhabit the river and adjacent country, which it would seem is, comparatively speaking, well peopled; for Captain Sturt estimates that he could not have seen fewer than two hundred and fifty of these Indians, among whom his party passed on the most friendly terms, and, indeed, were frequently indebted to them for kindly acts.

Captain Sturt, however, draws a most melancholy picture of these distant regions, which, notwithstanding the population found on their surface, were rendered, by the distress of the season, scarcely habitable. 'The natives,' he observed, 'were remarked wandering in the desert, and from the badness of the water which they were obliged to drink, had contracted a cutaneous disease, which was fast carrying them off. Birds, which were noticed sitting on the trees, appeared to be gasping for existence, amidst the glare of torrid heat. The wild dog, or dingo, was seen prowling about in the day-time, being unable from debility to avoid the party; and whilst minor vegetation was altogether burnt up, the very trees were absolutely drooping from the depth to which the drought had penetrated the soil. Several of the party were affected by ophthalmia, produced by the reverberated heat from the plains which they had traversed, where the

thermometer stood in the shade at three P.M. at 122°, or from 98° to 102° Fahrenheit, at sunset.'

The Darling may be justly considered the largest river which has been discovered in New South Wales, since it is formed by a junction of all the streams which were discovered by Mr. Oxley in 1818 (and these were five in number, each of considerable magnitude), as well as of those I met with in my journey of 1827; and thus it constitutes the great drain of a tract of mountainous country lying between the parallels of 27° and 33½°. But what ultimately becomes of this river so sustained, to what other channels it becomes united, what course it eventually pursues, beyond the spot where Captain Sturt and his comrade left it flowing through a desert country to the south-west, or on what coast it is discharged, if it really does make the sea at any point, remains wholly unknown, and is therefore still to be discovered.

The party were now glad to direct their steps towards Bathurst; but before they finally quitted these parched levels, they shaped a course to the eastward, with the view of meeting with the Castlereagh, the channel of which (one hundred and eighty yards in width) Mr. Oxley experienced no small difficulty in crossing, as the rains which had fallen on the mountains to the south-east, whence it derives its principal sources, had swollen its waters to the level of its upper banks. On making this river they traced it down full one hundred miles to its junction with another part of the Darling, the water of which they found even salter than it was at the point at which the expedition had originally fallen in with it; nor did they find a sufficiency in the Castlereagh to meet their daily demands, for its bed was laid bare 'for a distance of thirty miles at a stretch,' which obliged our travellers to 'search the country round' for the little water which it had to yield them.

Surrounded as the party were by difficulties in a region 'deserted by the native tribes,' scarcely capable of sustaining animal life, and in which all the dogs of the expedition fell a sacrifice, still Captain Sturt appears to have been unwilling to quit his ground; for although the briny waters of the Darling were in themselves quite enough to have induced him to have made a hasty retreat southerly, to higher grounds and a better country, we, nevertheless, find him crossing the Salt River, to see what the country was in a north-westerly direction; nor does it appear that the curiosity of our travellers was at all satisfied, until they had penetrated a considerable distance on that course, where they found the ground uniformly level, and the surface in no part broken by either creek or minor water-course, the entire country around being, as far as could be seen from the highest tree, 'a boundless flat,' the elevation of which above the level of the sea was, pro-

bably, not more than five hundred feet. Captain Sturt had at length done his utmost; he, therefore, very wisely directed his party to the southward, and soon reached Bathurst.

Thus, much of our knowledge of the internal parts of New South Wales in the parallel of 30°, was derived from the labours of this indefatigable officer; to whom was entrusted, at the close of 1829, the direction of a second expedition, destined to trace the course of the Morrumbidgée, another western stream, rising in a range of mountains situated to the southward of the parallel of 35°, and under the meridian of 149°, at a distance of about eighty miles inland from the eastern coast line, and within what is now denominated the county of Murray. Of the character of this river it may be here briefly remarked, that its bed forms a succession of planes, of which some are of great inclination; along these its waters flow with considerable velocity in nearly a west direction.

After receiving the Yass River and some other minor streams, all which fall into it at an early stage of its progress, namely, in longitude 148½°, the Morrumbidgee pursues a long and tortuous course for upwards of three hundred statute miles, without deriving the slightest increase from the country it waters; and thus in this respect it resembles the Lachlan, which maintains a parallel course through the low interior to the northward. From this fact may be inferred the generally steril character of a considerable portion of the country lying between the channels of these two rivers, and which was in part ascertained by Mr. Oxley in 1817. As its course extends to the westward of the meridian 147°, the Morrumbidgee falls on a low level; the hills of sandstone rock, which give a picturesque appearance to the lands on its banks, higher up the stream, disappear; and flats of alluvial deposit occupy their place.'

Thus far the river had been followed down some years ago, by stock-keepers in pursuit of strayed cattle, who also ascertained in their long rides along its banks, the extent to which the country westerly, from its elevation above inundation, might be safely occupied as grazing stations. The direction, which this river was also at that period known to take towards the marshes of the Lachlan, led to the conclusion, that both streams were united in those morasses; and on so low a level, (as was ascertained by Mr. Oxley in 1817,) as to favour the opinion that their confluent waters were rather dissipated over an extensively flat surface, than carried on in one body to the ocean, distant at least three hundred miles. And this opinion, gratuitous as it was, would nevertheless have proved to have been correct, had the Morrumbidgee not pursued its course so far to the westward as to reach the channel of a much larger river; since, as will presently be seen, it has neither magnitude nor velocity sufficient to force its way two

hundred and sixty miles to the sea-coast; but which the principal stream, by its volume and strength, has the power to effect.

The second expedition conducted by Captain Sturt proceeded from Sydney to explore the Morrumbidgee, in December, 1829. Tracing it down on its right bank, until he had passed every rapid or fall that might impede its navigation, he established a depôt—launched a boat, which he had conveyed overland from Sydney, and having, by dint of great exertion, built another on the spot, he lost no time in commencing his examination of the river to the westward. Before we follow the enterprising party on their voyage, it may be interesting to give the height of the river at the depôt, above the sea-coast, as derived from the observations of the late surveyor-general many years ago, on the adjacent country, which results it would have been very satisfactory had Captain Sturt been possessed of the means of verifying. This will show not only how slight is the inclination of its bed to give an impetus to its stream westerly towards the ocean, but also how perfectly unavailable to the colony are those vast flats of low country, which were observed to extend along its banks. The situation of his depôt Captain Sturt found to be in latitude 34¼° south, and longitude 143° 57′ east, or about twenty-seven geographic miles south-west from Mr. Oxley's extreme point of penetration on the steppes of the Lachlan, in July 1817, the mean elevation of which above the level of the sea, that accurate traveller had determined, by barometrical admeasurement, to be not more than two hundred and fifty feet. Now, as Captain Sturt informs us that the dispersed waters of those morasses again unite, and drain into the Morrumbidgee by a 'large creek,' which he passed about twelve miles west from his depôt, it is very evident that the bed of this latter river, and the country immediately adjacent, are at a somewhat lower level than Mr. Oxley's last or westernmost encampment.

On the 7th January, the expedition moved forward down the river, and on the fourth day, having passed extensive alluvial flats, on which were patches of reeds, the navigation became much interrupted by 'fallen timber,' and as the current was frequently very rapid, particularly in those parts of the river where its channel had become contracted, the boats were oftentimes in great danger from sunken logs. After advancing on their voyage about ninety miles to the westward, through a country of level, monotonous aspect, the party were relieved from the state of anxiety which a week's most difficult and dangerous navigation had caused, by their arrival at (to use Captain Sturt's words) 'the termination of the Morrumbidgee,' for its channel, much narrowed and partially choked by driftwood, delivered its waters 'into a broad and noble river,' the current of which was setting to the westward at the rate of

two miles and a half per hour, with a medium width from bank to bank of from three to four hundred feet. This 'new river,' which was called the Murray, and into which the diminished waters of the Morrumbidgee fall, is evidently formed by a junction of the 'Hume' and 'Ovens,'—which streams, taking their rise in the great Wanagong Chain, were first made known to us by the travellers Messrs. Hovell and Hume, who crossed them, two hundred and fifty statute miles nearer their sources, in their excursion to Port Philip in 1824. Pursuing the course of the Murray, on the 14th January, the voyagers made 'rapid progress to the W.N.W.,' noticing, as they passed on, a low 'unbroken and uninteresting country of equal sameness of features and vegetation,' to that observed whilst descending the intricate Morrumbidgee on quitting their depôt.

After nine days voyage down the Murray, in which period they made about one hundred miles of westing, without observing the slightest change of country for the better, or the least rise in its surface, the expedition passed the mouth of a stream flowing from the north by east, with a strong current, and in point of magnitude but 'little inferior' to the Murray itself. Ascending it, Captain Sturt found it preserved a breadth of one hundred yards, and its banks, on which were many natives, 'were overhung with trees of finer and larger growth' than those of the Murray. Its waters were, moreover, ascertained to be two fathoms in depth ; of turbid appearance, but 'perfectly sweet to the taste.' The confluence of these two rivers takes place, it appears, (by Captain Sturt's reckoning,) in exactly longitude 141° east, and immediately to the south of the parallel of 34°. It was at this stage of the expedition that the face of the country began to assume (comparatively speaking) an interesting appearance ; and the first rise of ground which had been seen in the advance of the party to the westward in a direct line of more than two hundred miles, was observed at a moderate distance from the river to the north-west. Previous to his reaching the point of confluence of the two rivers, Captain Sturt, it would appear, had entertained a doubt as to the 'decline of the vast plain through which the Murray flows,' as well as of 'the probable fall of the waters of the interior' to the north of it; but on observing a new stream flowing into the Murray, the circumstance of the 'parallel' (meridian doubtless) in which he had struck it, 'and the direction from which it came,' combined to satisfy him, 'that it could be no other than the Darling.' It was therefore concluded that the whole of the internally formed streams, at present known in that country, from my Dumaresq's River, (discovered in 1827 in lat. 29°,) to the Murray in 34°, are discharged into the ocean on the south-coast—the dip of the continent within the parallels of 28° and 35½°, being of course to that

point. However, the identity of this tributary to the Murray with the Darling, remains still to be ascertained,* before the declension of so considerable a portion of the interior can be said to be southerly, and before one can positively assert, with the president of a society in New South Wales, either that an interesting fact has been established—viz. 'that all the waters from the Bathurst country, owing to the dip of the earth, run to the south-west extremities of eastern Australia,'—or that these discoveries have opened a water communication from the south coast, 'one thousand miles through a variety of agricultural and pastoral country, in one of the finest climates which the world can boast of,' and capable of sustaining 'millions of emigrants.'

The character of the Darling, as also the general direction of its course, beyond the point to which it has been traced, we have yet to ascertain. Since, however, it is by far the most considerable inland stream at present known in that country, it is to be hoped, that its further examination, which may furnish much interesting information respecting the actual features of the more remote regions of the interior to the north-west, will ere long be prosecuted. But to follow the expedition down the Murray.

That river, after it receives the supposed Darling, continues its course upwards of a degree farther to the westward, and in that space receives a second stream, which falls in on its left bank from the south-east. This tributary stream, which is described as a river of 'considerable importance,' and was named the 'Lindesay,' is most probably the 'Goulburn' of the same indefatigable explorers, whose journey overland to the south coast in 1824, I have already adverted to, and who, in fording their river at a part where its channel presented a breadth of eighty yards, left it winding its course to the north-west. From this point, the Murray assumed a new feature, and along its northern bank extended a range of cliffs, which appeared to the party, as they passed beneath them, to be of 'partial volcanic origin.' The navigation at length became rather intricate, for those cliffs being immediately succeeded by others on each bank, of limestone, the river was found to force its way through a glen of that rock, in its passage frequently striking bases of precipices of the same formation, which rose to a perpendicular eleva-

* There is an intermediate tract of unknown country, exceeding in extent four hundred miles, between the southernmost point of Captain Sturt's examination of the Darling River, and the junction of the stream, discovered in the progress of this second expedition, flowing from the northward into the *Murray*; and as these exhibit no one character common to both, we cannot, in the present state of our information, arrive at a satisfactory conclusion, that the tributary to the *last-mentioned* river, and that great drain of the country to the north of the parallel of 34°, the Darling, are one and the same stream. The river flowing into the Murray is said to be sweet to the taste; the Darling, on the other hand, is described as strongly impregnated with salt.

tion of two hundred feet, and in which 'coral and fossil remains' were remarked to be plentifully imbedded. At this stage of their passage, those long ranges of forest hills, which extend along the eastern shore of the Gulf of St. Vincent became discernible, indicating to the exploring party their approach to the coast. On the 3d February, the river having reached the meridian of 139¾°, the disposition of the bounding cliffs gave its course a decided bend to the southward, through a continuation of the glen, which at length opened into a valley.

Here the river was observed to have lost the sandy bottom which it had exhibited throughout its long course from the eastward, for its bed having now dipped to almost the level of the sea, its waters had become 'deep, still, and turbid.' Its course to the south was followed by the voyagers along reaches of from two to four miles in length; and upon their passing the parallel of 35°, a more open country appeared before them, for the cliffs having partially ceased, had given place to picturesque hills and lower undulations, beneath which extended 'thousands of acres of the richest flats;' but, as Captain Sturt adds that these were covered with reeds, and were evidently liable to inundation from the river, the value to the agriculturist of such marshy grounds, scarcely at all elevated above the sea-shore, may be easily estimated.

On the 8th of February (the thirty-second day of the voyage from the depôt) the hills 'wore a bleak appearance,' and the few trees, which had at one period fringed their ridges, were for the most part broken off, 'as if by the prevalent winds.' At noon, upon entering the river's last reach, no land could be discerned at its extremity; some low hills continued, however, along its left bank, whilst its right was hid by high reeds. Immediately afterwards, these enterprising voyagers entered an extensive lake, the body of which stretched away far to the south-west, in which direction 'the line of water met the horizon.' This lake, which received the name of 'Alexandrina,' was estimated at from fifty to sixty miles in length, and from thirty to forty in breadth. A large bight was observed in it to the south-east, and an extensive bay at the opposite point; still, notwithstanding these dimensions, this very considerable sheet of water appears to be but a mere shoal throughout, since Captain Sturt states 'its medium depth' is but 'four feet'!

Upon this vast but shallow lake, he pursued his voyage to the southward, remarking that its waters, which at seven miles from the point of discharge of the Murray into it were brackish, were at twenty-one miles across perfectly salt, and there the force of the tide was perceived. As the party approached the southern shore, the navigation of the boats was interrupted by mud flats,

and soon their farther progress was effectually stopped by banks of sand. Captain Sturt therefore landed, and walking over some sandy hummocks, beyond which he had, from his morning's position, seen the sea, almost immediately came out upon the coast at Encounter Bay of the charts, whence he took bearings to Cape 'Jarvoise,' (rather Jervis of Captain Flinders,) and the south-east point of Kangaroo Island. At the lower part of the lake seals were observed, and near the spot on the southern shore, where the party had effected a landing, some natives were seen grouped together, but as they bore arms and had their bodies painted, it was obvious that their intentions were far from being friendly; nor did they, although they saw the party were peaceably disposed, attempt to visit the encampment of the travellers during their stay on the margin of the lake.

Having thus seen the termination of the Murray and the outlet of the lake into which it falls upon the south coast, Captain Sturt lost as little time as possible in conducting his party back by water to his depôt—circumstances not permitting of a more perfect examination of that extensive piece of water, from the north-western extremity of which, some hopes had been entertained of there being a clear and open communication with the Gulf of St. Vincent.

Now we gather from the results of this second tour of discovery of Captain Sturt, simply this, and no more, *viz.*—in what way the Morrumbidgee, as well as the several streams which were crossed by Messrs. Hovell and Hume in 1824, and the waters of the Lachlan of Oxley in 1817, (all which unite,) are disposed of; as also the nature of the 'unbroken, uninteresting country,' lying to the westward of the marshes of the latter. It must, however, be acknowledged that, in effecting this service, Captain Sturt has added largely to the geographical knowledge which we previously possessed, since the facts ascertained by him during the progress of his expedition have enabled him to fill up no inconsiderable blank on the map of that part of New South Wales, lying to the west and south-west of Port Jackson. That the expedition of this enterprising officer has opened to the settler 'unmeasurable tracts of well-watered' country previously unknown, as stated in the report of a society in the colony already referred to, his despatch to the local government does not in the slightest degree support; nor does it contain the announcement to the colonists, that a river, navigable for commercial purposes, has been discovered in that country, which can be available at some future day 'to convey to the coast the wools and other exportable produce' of the settlers, who may hereafter be established in those parts of the interior which lie in the neighbourhood of its banks. The reverse is the fact. The Murray, when flooded from the eastward, will doubtless

carry a boat safely down its channel, but as a navigable river at all seasons, it is, like the Macquarie, and indeed every other western stream, useless to the colonists. Even if the Murray were throughout the year, and during the driest seasons, a deep navigable river, its waters could not be rendered of use for the purposes of commerce, since it discharges itself into a shoal lake, and that again into the sea at Encounter Bay, where, although the passage is, as Captain Sturt states, 'at all periods of the tide, rather more than a quarter of a mile in width, and of sufficient depth for a boat to enter,' still, as he also observes, and the master of every coaster well knows, '*a line of dangerous breakers,*' which are constantly rolling against the sand-bars thrown up by the prevalent winds, '*will always prevent an approach to the lake from the sea, excepting in the calmest weather; whilst the bay itself will at all times be a hazardous place for any vessel to enter under any circumstance.*' The opinion also, which has been entertained, that a more practicable communication with the lake might be found from the Gulf of Saint Vincent is wholly gratuitous, for a reference to the voyage of Captain Flinders, who closely examined the shores of that deep bight, and an inspection of the chart of that able navigator, (the accuracy of which, generally, no seaman ever doubted who had sailed by it,) on which is laid down a range of wooded hills, extending from the promontory of Cape Jervis northerly, along the whole of the eastern shore of the gulf, are sufficient for us rather to entertain every doubt of the existence of such a channel of communication with the north-western bay of the lake, which is *itself*, in all probability, nothing else than an extensive mud-shoal *.

I have now given the sum of our geographical knowledge of New South Wales up to the present period; and dividing the map of that vast country into seven equal parts, one division will fully include the tracks of all the journeys which have been undertaken since 1817, with a view to discovery, by Oxley, Sturt, Hovell and Hume, myself, and others; whilst the remaining six portions, which comprehend a great expanse of interior beyond the tropic, and the whole of the equinoctial part of the continent, continue, at this day, a vast region, entirely unknown. The want of navi-

* [Since Mr. Cunningham's observations on this subject were written, the Colonial Office has received accounts from New South Wales, which show that the expectations which were entertained by Captain Sturt of the existence of a communication between the Gulf of St. Vincent and the Lake Alexandrina were destitute of foundation. With the view of setting this question at rest, an accurate survey of the Lake was recently made by Captain Barker, an officer of the 39th regiment, on his return from King George's Sound, where he had been employed on detached duty; and it is a matter of sincere regret, that from an excess of zeal in geographical science, this enterprising officer should have lost his life, in the prosecution of this object.]

gable rivers in that 'Great South Land,' must necessarily impede the progress of discovery in the interior of the country.

In closing these geographical remarks on New South Wales, I trust I may be permitted to point out the directions in which more extended expeditions of discovery might be employed in that country, and which, if conducted by individuals every way competent to such service, would assuredly put us in possession of such information, as would go far towards showing us the real features and character of central Australia,—its animal and vegetable productions,—the extent to which a region so remote from the coasts is peopled, and that which would not be the least interesting in the inquiries of such exploring parties—its system of rivers.

One expedition might be despatched to follow the course of the Darling, from the point Captain Sturt quitted it in January, 1829; or the party might be directed to trace up, in a northerly direction, the auxiliary stream that falls into the Murray, which was supposed to be the Darling; either would set at rest all doubts respecting the identity of these waters, or furnish clear proof of their being distinct rivers.

A second long and interesting journey might be undertaken, from any one of my points in the Moreton Bay-country, on the western side of the dividing range, to penetrate to the tropic, by pursuing a course as much to the westward of north-west, as the internal country, by furnishing the requisites, grass and water for the animals employed, would permit. An expedition well appointed, and furnished with six months' provisions, and moreover favoured by the country affording wherewithal to sustain animal life, might cross the tropical circle in longitude 140°; upon gaining which, the party might be directed to descend southerly under that meridian to the latitude of Moreton Bay; and, reaching that parallel, to shape a course to the eastward, in order to make the point on the coast-line, from which the expedition had originally taken its departure. In the considerable triangle which such a route would describe, the character of a large tract of internal country would be fully ascertained; and if there are any high lands to the westward of the above-mentioned meridian, which is perhaps very doubtful, these would be seen, and even visited, if not too far remote, and the several rivers, of which there are doubtless many, in four and a half degrees of latitude, flowing inland from the dividing range to the eastward, would, in the progress of such a journey, be repeatedly crossed and their tendency ascertained.

Again; of all the coasts of the continent of Australia, the north-western, as affording encouragement to hope that outlets of internally collected waters might be there discovered, calls for peculiarly minute and patient examination. Upwards of one hundred and thirty years ago, that celebrated navigator, Dampier,

whilst on that coast, found the southern parts of De Witt's Land to consist of a range of islands (now bearing his name), among which he remarked such an extraordinary rise and fall of the tides, as induced him to give it as his opinion that the northern part of New Holland was separated from the lands to the southward by a strait; unless, says he, 'the high tides and indraughts thereabouts should be occasioned by the mouth of some large river, which hath often low lands on either side of the outlet, and many islands and shoals lying at its entrance.' This opinion, says Captain Flinders, he supports by a fair induction of facts, and the opening of twelve miles wide, seen near that part of the coast by Vlaming's two vessels, and in which they could find no anchorage, strongly corroborates Dampier's supposition.

What those early navigators remarked, has been more than abundantly confirmed, lately, by Captain King, whose more extended observations upon the character of the tides, the rushing force of the currents, and other phenomena on those inter-tropical shores, all lead to the conclusion, that if that peculiarly constituted country furnishes any streams of magnitude worthy to be compared with those of other continents, the estuaries of such will most assuredly be found on that extensive line of coast.

At the close of the surveys of this latter very able navigator in 1822, there remained between Dampier's Archipelago, in latitude 22°, and Cape Hay in 14°, about five hundred miles of coast, wholly unsurveyed and unseen. Moreover, there is reason to believe, that even of those portions of that coast which were examined during those voyages, which employed between four and five years, some parts will be found to be rather large groups of islands,—the main shore itself, being probably, far distant to the eastward.

To complete the survey of that considerable range of coast, the employment of a vessel, thoroughly equipped for so intricate, dangerous, but, at the same time, most interesting service, would at once settle the great geographical question, viz. whether or not Australia, with a surface equal nearly to that of Europe, discharges on its coast, a river of sufficient magnitude to lead, by a long, uninterrupted course of navigation to its central regions; by which alone a knowledge of the capabilities of such distant parts of the interior may be acquired, and the produce of the soil be one day conveyed to its coast.

NEW ZEALAND.

Sandy B.
Bay of Islands
Jokianga R.
Kaipara R.
Manukau R.
Waikato R.
Kawio
Bay of Plenty
C. Runaway
C. East Isle
Table Cape
Hawkes Bay
C. Egmont
Cook's Straits
C. Stephens
C. Palliser
Charlotte Sound
C. Campbell
Cook's Mistake or Pegasus Bay
Bank's Peninsula
Cascade Point
Dusky Bay
C. West
Foveaux's Straits
Stewarts I.d
Cape South
Southern Port
Molyneaux's Harb.
TAVAI POENAMMOO
EAHEINOMAUWE

50 0 50 100 150 200
Geographical Miles

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J. & C. Walker Sc.

VIII.—*Notices of New Zealand.* From Original Documents in the Colonial Office, communicated by R. W. Hay, Esq. Read the 9th of April, 1832.

'In New Zealand flax may be obtained in an unlimited quantity, and there is abundance of fine timber of all sizes and dimensions for ship-building and other purposes. Thousands of tons of shipping may be employed in the flax trade alone; and the timber which grows occasionally to a great height, and not unfrequently six feet in diameter, may be procured in any quantity. The country is rich in mineral and vegetable productions; the soil fertile and easy of culture.

'In both islands there are extensive lakes; and the rivers are also numerous, and mostly navigable, generally running north and south, and branching off into others, from which run numerous streams and creeks. The rise and fall of tide along the whole coast is considerable, but greatest to the southward; at Kokianga (which is to the northward) it is fourteen or fifteen feet in the springs. The harbours and bays are, perhaps, the finest in the world, and few countries, indeed, possess so many equally capacious, safe, and easy of access. The climate is very healthy, and free from those hot and pestilential winds, destructive to cultivation, which characterize the climate of New South Wales: nor is the thermometer subject to the sudden changes observable there.

'From all the information that can be collected, New Zealand is far from being thickly peopled; but is rich, beautiful, and fertile. The natives have an intuitive respect, blended with fear, for the English,—the chiefs, for the most part, desiring to place themselves under British protection. They do *not* possess courage, but are cunning, easily taught, clever, fond of show, hardy, and capable of undergoing great fatigue. They require to be treated with a mixture of kindness and firmness.

'With regard to the whaling establishments in New Zealand, it may be observed, that as they are of use only for about four months in the year, they are not likely to become permanent, unless combined with some other pursuit for the summer season. And from the destructive nature of the fishery (the females being killed at the time of calving) the trade cannot last many years; but like the sealing, will eventually fail from extermination, or from the desertion of the land by the harassed animals. The fishery is confined to the middle and Stewart's islands, the whales not being found north of Cook's Straits.

'The flax settlements will rapidly assume a more permanent form, as the present desultory and speculative system progressively fails from the increasing unwillingness of the natives to dress the

hemp, and from its depreciated value at home on account of the dirty state in which it is supplied.

'There seems yet but little prospect of uniting any number of the natives under one leader. They are subdivided into many small communities or families, without any one individual having the slightest recognized authority, and are excessively jealous of each other and of their equality. With the exception of slaves, they have no distinctions of rank, every one, not a slave, being equal to every other. The elder of a family, in time of peace, meets with some little deference;—in war the most enterprising takes the lead. The property of the soil is well defined, their jurisprudence extensive, and its penalties are submitted to without opposition, even by the stronger party. We find amongst them none of the volatile spirits of the islanders in warmer latitudes, but a proud, haughty, independent race, who think deeply, reason acutely, compare the past with the present, anticipate the future, and are as dogged and persevering amidst their fogs as the Briton is in his.

'In the four Church Mission stations of Rangiliona, Renken, Paihia, and Waimate, there are, under a regular course of education, about three hundred and twenty New Zealanders, whose average age is sixteen years. When the hours appointed for instruction in reading, writing, and accounts, are expired, the greater number of these natives are employed in the mission, some in building, others as carpenters, and others in general labour. There are three substantial chapels, capable of holding from two to three hundred each, in which services are held three times every Sunday, and always well attended.

'The natives are anxious to be placed under the protection of British law, and would be willing to receive any person vested with power to enforce it.'

References to the Chart.

A. 'Sandy Bay. The river Ranganna falls into this bay. Clear channel, three fathoms; rise and fall fourteen feet. It rises south-west, and has a course of about forty miles through a rich flax country, not yet frequented by Europeans.

B. 'The River Hoduda falls into this bay after running through a fine timber country; but is accessible only to small vessels.

C. 'Wangaroo Bay, a fine harbour, formerly the location of the Wesleyan Mission. No navigable river; fine courie pine grows in the vicinity, but difficult to bring down.

D. 'Bay of Islands, or Tokeran, the most frequented port in New Zealand, particularly by the outward and homeward bound

whalers, both British and American. It is the seat of the Church Mission, who are now a very numerous body. Including the missionaries and their families, the white population of the Bay of Islands must exceed one hundred.

'A few miles south of this port is the pretty little harbour of Wangari. We then come to the river Thames, which is well known.

E. 'Taoranga: three or four white men here in charge of flax belonging to different vessels;—they are only casual residents.

F. 'Mascetu—a flax settlement; four Europeans here; likely to be a permanent and increasing establishment. The Bay of Plenty is one of the richest flax districts in the northern islands; but the rivers Taoranga and Maketu are both small and incommo dious, and the open roadstead is dangerous. White Island in this bay is an active volcano. Mount Edgecombe is about ten thousand feet above the sea.

G. 'Hawkes Bay;—at Turanga, in this bay, is a flax establishment, with five or six white men resident. Timber very fine of all kinds, but not easy of access; and the bay is very open.

H. 'Port Nicolson, a noble harbour.

I. 'Entry Island, or Kapiti. This is the general native depôt for the flax dressed on the north shore of Cook's Straits. It is very much resorted to by vessels in search of flax. There were, by the last accounts, thirty Europeans upon it;—some few as agents for persons in Sydney, but, for the most part, idlers of bad character. At this island the brig Elizabeth Stewart received on board the chief Ranparara, and two hundred men, for transport to Banks' Peninsula.

K. 'Taraaki. No harbour, but good roadstead. There are eight or ten European idlers who live as natives; it is much resorted to for flax. Mount Egmont is an active volcano.

L. 'Gannet Island. On the main, opposite this island, is the harbour of Kawia; a bar entrance two and a half fathoms. Here are several small flax depôts, under the charge of European agents of parties in Sydney, and others.

'Between this and Kokianga are the rivers—Wackato, shallow and with a dangerous bar entrance; Manuka, clear channel of seven fathoms, with a magnificent stream rising north-east close to a branch of the river Thames, the neighbouring country abounding with the finest timber and flax, but not inhabited; and Karpara, a fine basin about eight miles across, having five considerable rivers running into it from different directions after traversing beautiful timber and flax districts;—one approaches so near to the Thames on the east side, that the natives drag their canoes from one to the other. It has a bar entrance from the sea; soundings unknown.

M. 'River Kokianja, well known and surveyed. The Wesleyan Mission resides here, about twenty miles from the mouth. A mile higher up is the settlement, for ship-building and other purposes, established originally by Messrs. Browne and Baine, now occupied by Mr. Macdowell. It still gives employment to about twenty mechanics, but the dock-yard is abandoned. Total Europeans about fifty-two. The middle island (Kaikolda) is yet but little known. There are now no natives on the shore of Cook's Straits, nor on the west side of the island. The east side is also but thinly peopled along the coast.

N. 'Cloudy Bay is the chief resort of the black whalers. This fishery is generally carried on by vessels moored in the numerous fine coves, with try works on board.

O. 'Banks' Peninsula; scene of the horrid massacre by the brig Elizabeth Stewart, the most northern native town on the island.

P. 'Preservation Harbour and Chaldy Bay, both fine harbours. Several whaling establishments. The middle island is frequented by the black whalers belonging to Van Diemen's Land.

'In the year 1818, 60 tons of New Zealand flax were sent from Sydney to England, of the value of 2600*l.* In 1830, twenty-eight vessels, averaging $110\frac{25}{26}$ tons burthen each, made, in the aggregate, fifty-six voyages to New Zealand; the total tonnage thus cleared having been 5888 tons. In the same year, twenty-six different vessels, of the average tonnage of $114\frac{19}{26}$ tons each, made forty-six passages inwards to Sydney, their aggregate being 4959 tons.

'It also appears, that of seventy-eight vessels which cleared out from Sydney "for foreign states, South Sea Islands, and fisheries," fifty-six were to touch at New Zealand; and of sixty-four arrived under the same heads, forty-six had been there.'

IX.—*Particulars of an Expedition up the Zambezi to Senna, performed by three Officers of His Majesty's Ship Leven, when surveying the East Coast of Africa in* 1823. From Materials communicated by Captain W. F. W. Owen, R.N. Read June 11, 1832.

THE party consisted of Lieutenant Browne, Mr. Forbes, midshipman, and Mr. Kilpatrick, assistant-surgeon, attended by two black servants, one of whom was from the dock-yard at the Cape, where he had been apprenticed after his deliverance from a slave vessel; the other a free man, who spoke Portuguese, and on that

account was hired. The object of the expedition was to explore the Zambezi.

On the evening of the 23d of July, they left Quilimane, amid the cheers and good wishes of the crews of two of the Leven's boats which were there at the time. The canoe in which they went was of the largest description, and capable of carrying eight or ten tons. It was supplied by the governor of Quilimane, and was under the charge of a subaltern black officer, who was directed to accompany the party. At day-break on the 24th they passed the small river of Masave, which joins from the northern side. The Quilimane still maintained the same breadth as it did opposite the town (one mile), and the marshy feature of the banks yet prevailed, with mangroves to the low-water mark. Hippopotami at times showed themselves, and the trees on each side were covered with aquatic birds, of which, in the course of the day, they shot four species. About noon they landed on the south side of the river, at the village of Marangane (N.B. Lieutenant Browne calls this village Nusongo,—Antonio, Chingoalla,—Adonis, Millambahney, and Mr. Forbes, Marangane), where they had been directed to call for refreshments by the governor of Quilimane, to whom the place belonged. However, all that they could obtain was a couple of fowls and a few oranges of very excellent flavour. Marangane is about eight miles from Quilimane, and is built in a straggling way, on a piece of ground elevated a few feet above the general level of the surrounding country. It is inhabited solely by slaves, who cultivate a tract of land in the vicinity for their master, to supply in part themselves and those of their class collected in depôts for the Brazilian markets. Contrasted with the gloomy appearance of the mangrove-covered swamps around, even the humble Marangane became picturesque from its prominent situation, amid extensive groves of cocoa-nut and orange-trees. Mr. Forbes procured some beautiful specimens of plants, and shot various birds, principally of the king-fisher kind. After quitting Marangane they came to several islands, two of which, Massancy and Tinlong, (according to Lieutenant Browne,) they passed previous to arriving at the large one of Concevo, or Conrevo. Yet this, although dignified by the name of large, was only one mile long. It was very flat and thickly covered with mangroves, and numerous birds of the gallex order resorted to its banks to feed on the worms, with whose holes, and those of the diminutive land crab, its muddy limits were perforated. Shortly after passing the island they arrived and stopped, for a short time, at a small village in the district of Eloba, on the north bank, erected about two hundred yards from the river, on a dry sandy piece of soil, only approachable by a hippopotamus track through the large reeds of the intervening marsh.

At this place the banks were entirely clear of trees, as was also the north-east quarter, as far as the eye could reach. Leaving this village, they shortly afterwards anchored for the night, and on the morning of the 26th, renewed their journey. A herd of wild buffaloes were feeding on the river's bank, but alarmed at the approach of the boat, before they were within rifle shot, retreated in the utmost trepidation from the scanty shelter which the straggling thickets afforded, into an adjoining wood. Shortly after they passed two small islands, termed Copson and Covello, beyond which the river was reduced to about three hundred fathoms in breadth, and a little farther on to much less. The strength of the ebb-tide delayed them, for a short period, at the small village of Moona; after which they continued on, passing a long sand-bank and the village of Chumbasac, where the river was scarcely one-tenth of a mile across. About ten at night, they also passed the island of Cocha, covered with lofty trees, and divided from the main-land by a small and shallow creek. The channel was now so reduced in breadth, as, in some parts, to be scarcely twenty yards across, and its depth of water was not more than eight feet; but the banks assumed a much more pleasing appearance, especially the left one, which was high and thickly wooded. They still continued slowly to prosecute their tedious way till some time after midnight, when they stopped and anchored off the village of Antaree, situated on the northern bank. From this time, until they arrived at Boca de Rio, on the afternoon of the 28th, they passed through a complete archipelago of islets, the channels between which were so shallow, that even the three small canoes into which they had the last day exchanged with their effects, could proceed no higher. At this place the river was not more than twenty or thirty yards across; and the distance, counting the various windings of the stream forty-seven miles from Quilimane, but in a straight line only thirty-two, in a W.S.W. direction. The breadth of the river, in the wet season, is much greater. The water was perfectly fresh, but dirty, and much impregnated with decayed vegetable matter. Boca de Rio is a small village, and its native name, according to Lieutenant Browne, is Moonboosh, but according to Adonis and Antonio (the black servants), Maccomboosh, which latter is more probably right, as it agrees with the name of its chief, who, according to an almost general fashion in the country, assumes the appellation of the village or district he governs. Maccomboosh was a tall stout man, who spoke Portuguese fluently. The party repaired to his house with their effects, and there took up their quarters for two days, during which time Messrs. Forbes and Kilpatrick obtained a large and interesting addition to their collection of plants and birds, while Mr. Browne employed himself in sketching, and making astronomical observations.

As the season of the year precluded the possibility of their ascending any farther by water, they were obliged, in order to reach the river above the shallows, to travel some miles by land. Accordingly, on the 30th, in the afternoon, they left Boca de Rio, Maccomboosh furnishing the gentlemen with palanquins and natives to carry their effects. The country they passed through was flat, but dry, well cultivated, and abounding in villages. At times they came upon the course of the river, whose breadth, in some places, was reduced to sixteen feet, with high banks at some distance on either side, serving as the boundaries of the wet season floods. On the afternoon of the 2d of August they arrived at the house of Pasco Mariano, a Kamareen, who received them in the most kind and hospitable manner. The morning of the 3d dawned upon them in all the beauty of a cloudless sky, and although a profound calm prevailed, yet the air was not close and oppressive, but pleasant and refreshing. Our travellers had not enjoyed so good a night's accommodation since their departure from Quilimane, so that Lieutenant Browne was the only one who could muster up sufficient resolution to quit his bed in order to take the customary morning's bath in the river, which was now that of the Zambezi, just where it divides, and forms the noble river of Luabo on the one hand, and on the other, the branch which they had ascended communicating with Quilimane. As Mr. Browne was about to plunge into the water, he was arrested by the loud calling of his kind old host, who came running up in great trepidation for his safety, and informed him that he must not venture into the stream as it abounded with alligators, who, a short time back, had devoured a son of Donna Pascoa, a lady to whom the party had a letter of introduction. This day, for the first time, Mr. Forbes felt himself unwell, so much so, that after Mr. Browne had read prayers to his small congregation, he was unable to accompany that gentleman and Mr. Kilpatrick in a long walk which they took on the banks of the river, and in its vicinity to the westward. The land, where cultivated, was chiefly sown with peas and other sorts of pulse; but where left untilled, was covered with a long coarse grass. The village of Marooro, in which Pasco Mariano lives, is extensive, and consists of about forty huts, each of which, on an average, might contain five people. Mariano's dwelling, from its large size, is a conspicuous object among the others. It is built, in the fashion of the country, of bamboo poles and grass, and is encircled by large enclosures, containing oxen, sheep, goats, geese, ducks, and fowls. The river winds majestically along between steep banks of more than twenty feet in height, which, during the rainy season, lasting from November to March, are overflowed, and the country inundated for miles around, the deep water channel then extending upwards of a mile and a half in breadth. Yet,

notwithstanding the rapidity of the current, boats often ascend against it, by availing themselves of its diminished strength over the inundated lands. Several streams branch off from the Luabo, one of which bisects the portion of land contained between that river and the Quilimane, and discharges itself into the sea at a place called Melambey. The Luabo, in its course to the sea, is blocked up by sands, the existence of which, even in the Zambezi, off Marooro, was apparent in every direction.

Mariano held the rank of Colonel of militia, and had under his command about one hundred natives, armed with muskets. He likewise, according to the custom of the country, was a merchant, and dealt largely in ivory and gold-dust. His days were spent in one unvaried routine, and the diary of one would suffice for all the others. He rose early, and amused himself in the balcony until breakfast time smoking several carotes, a description of small segars, made of shag tobacco, rolled up in the banana leaf, which gives them a peculiar, and, to smokers, a pleasant flavour. At eight he breakfasted, and then busied himself among his people, slept away the noon hour, and dined at two, the table groaning under a profusion of meats, dressed in a variety of ways, in which port wine generally formed a principal ingredient. After the repast was ended, and he had smoked another carote, the old gentleman once more retired to rest, and did not rise again until the coolness of the evening drew him forth, enveloped in a cloak, to enjoy the freshness of the air. At nine he supped, and shortly afterwards retired to bed.

On the evening of the 14th, Mr. Forbes, who appeared to be getting on tolerably well, had a severe relapse, and was bled. Colonel Mariano, however, much disapproved of this treatment, and recommended instead that which he always pursued with his own people, viz. to produce by all possible means a profuse perspiration, and to drink abundance of rice-water. But Mr. Kilpatrick would not acquiese, stating as his reason, that an European constitution required far different treatment to that necessary to be pursued with one inured to the climate.

Although the bed of the river is sandy, yet the soil in the vicinity is quite otherwise. Around Marooro the country is perfectly flat; and in the neighbourhood of the colonel's house and village is cultivated for two or three miles in every direction, principally with the long grass already noticed, which, before it is perfectly ripe, is plucked up, dried, beat in a large wooden mortar, and then ground between two rough stones, one of which is placed on the earth, with a basket under it to receive the meal, and the other worked by hand above. The meal is made into porridge, and in general eaten with fish, with which, of the largest size, and finest quality, the river abounds. The farther our tra-

vellers advanced from the coast the more they observed the natives to improve in their appearance. Of those at Marooro, many were firmly knit, stout, and elegantly proportioned; the attendants on the colonel, in particular, were perfect models of the human form. With the exception of a piece of cloth around them, barely sufficient for the purpose of decency, they go naked. Some have their beards shaved, others only in part, but many not at all. In this latter case the hair (for it is worthy of remark that they have not wool) grows long, is neatly plaited, and hanging in slender tails, communicates to the countenance a wild and savage aspect; in this resembling the people of Madagascar, whose hair is neither wool nor hair, and dressed, in general, quite similarly. The proportion of the females appeared small; and it was remarked that they were, in general, either of an advanced age or children. Excepting the cultivated spots above noticed, the country about Marooro is covered with long rank grass, rushes, and bamboos, interspersed with extensive swamps. Dreadful, indeed, must be the fetid vapours which arise from these, and impregnate the atmosphere during the insufferable hot rainy season! Even to the inhabitants the air is then perceptibly noxious and oppressive, and to our travellers, notwithstanding the cool temperature of the evenings, when walking along the narrow pathways cut through the grass and bamboos, growing far above their heads, the sensation of closeness was highly oppressive. Among the few varieties of trees which were noticed, two different species of palms formed the greatest proportion; these were scattered over the boundless plain, but so detached and few in number as scarcely to break the uniformity of the prospect.

On the evening of the 5th Mr. Forbes was very ill; but having passed a good night, he felt himself so much relieved in the morning as to be able to undertake the journey to Chapongah, the residence of Donna Pascoa. The canoe in which he embarked was purposely fitted up in a superior and more comfortable way for his reception, having a canopy of rushes above, and a well arranged couch beneath. Previous to departure, their hospitable old friend had a breakfast prepared for them, and a meal ready cooked to eat on the way, together with a proportion of wine, and a large supply of fowls and rice, thus winding up a series of unabated kindnesses, by a provident attention to the future comforts of his guests. He entreated them to take care of themselves, loaded them with good wishes for their success, and long after they had quitted the shore, continued to wave his handkerchief as a farewell, and to commend them to the Almighty's protection. Notwithstanding the great width of the river, the channels in it were found narrow and winding, among extensive sand-banks, often dry. The torrent that rushes past these is so

impetuous in its course, that it is only in the eddies that boats can possibly ascend, unless by tracking; and in this manner Mr. Browne and his party continued on, generally at about the rate of a mile and half in an hour. Many of the sand-banks were nearly twenty feet in height, yet had the appearance of being overflowed during the rainy season. The banks of the river were mostly lined with rushes and long grass, with here and there a solitary palm-tree. The depth of water varied considerably; in some parts it exceeded two fathoms, and in others scarcely as many feet. As the evening closed the party arrived at Chapongah, the residence of Donna Pascoa de Almeyda, who received them at the portico of her house, with many expressions of welcome.

Next morning, the 7th, Mr. Browne rose early, and amused himself rambling about the vicinity of the donna's house. This was of tolerable construction, consisting of one story, and built on a slope near the river; the land round it was cleared and cultivated, with the exception of one small spot, where four or five trees of a gigantic size were allowed to remain unmolested, the largest being above sixty feet in circumference. At the back of them was a village of considerable extent; and beyond that again a small hill, covered with trees, and reported by the inhabitants to afford shelter to innumerable lions, tigers, elephants, &c., the devastating prowess of which they illustrated by a variety of horrible tales. To the eastward there was a grove of mango-trees, under the shade of which several large canoes were laid up; one of these, hollowed out from a single tree, was fifty feet long, four deep, and five broad.

The Donna's establishment was on a much more magnificent scale than that of Mariano's, and the display at meals was in every respect sumptuous, the table being covered with massive silver utensils, and wines and eatables of many descriptions cooked in a variety of ways. The Donna was engaged in trade, and accounted the richest person in the colony. Her principal agent was a Bengalee,* who travelled about with Indian and European goods, and collected in return, gold, ivory, and slaves, from the natives. Mr. Browne had heard much of a lake situated some distance to the southward of Chapongah; and on the morning of the 8th, repaired in his machilak (a bed, or rather hammock, slung to a pole and carried by slaves), with Mr. Kilpatrick, to view it, against the advice of the Donna, who dreaded their exposure to the attacks of wild beasts in the forest. Their way at first led over a gentle rise, and afterwards along an extensive plain, covered with wood; they consequently could see

* Along the whole east coast of Africa the principal traders and trading agents are, in like manner, Indians.—W. F. W. O.

nothing but a succession of trees; but these were sufficiently worthy of admiration, from the great variety in their foliage, and the beautiful appearance which the creeping plants presented, climbing and hanging from the branches in festoons from tree to tree. Two hours' quick travelling brought them to the lake; it was a large expanse of water, upwards of three miles in circumference, and surrounded, on all sides, by a thick and almost impenetrable forest. The hippopotami were basking in great numbers on the muddy banks, but immediately retreated to the water, from whence they rose afterwards only at times to breathe; no traps or pits to catch them were observed, but Mr. Browne was informed that the natives killed them in numbers, either with muskets, of which they had many, or with assagays, as they wandered heedlessly through the wood, whose extent was not less than six miles. Before returning home, our two travellers spent some time in walking about the vicinity of the lake, during which they passed two or three villages inhabited by wood-cutters, turned up a large herd of deer, and shot some birds. Donna Pascoa was governess of the district, for which she annually paid eighty-six Spanish dollars to the king, besides discharging various expenses which occurred in managing it. She had no other soldiers than militia, formed by the native negroes, but said that, if required, she could with ease obtain them in eight days from Sofala. Some idea may be formed of the extent of her territory, by the time requisite to travel to its south-west boundary. It is there they procure the trees from which the enormous canoes are hewn, and to transport them for that purpose on rollers to the river, one month's labour, at the rate of five miles a day, is required. These trees bring in a considerable profit to the Donna; but her wealth would be much increased if she were permitted to work two gold mines lately discovered in her territory, and of which she presented a specimen, weighing nearly a quarter of an ounce, to Lieutenant Browne. Every resident pays her taxes in kind, consisting of bees-wax, fowls, meal, vegetable oils, rice, &c., but to what amount was not ascertained. Although she was allowed to be far superior to the other Portuguese or Creole ladies in the colony, yet she was sadly ignorant.

The effects of the fever on Mr. Forbes varied much;—at times he considered himself rapidly recovering, but at others would sink under a relapse so severe as to hold out small expectation that he could possibly survive the next day. However, on the 11th he found himself so much better that he expressed a strong desire to continue the journey to Senna; and accordingly two canoes were prepared, the larger of which afforded excellent accommodation for him. The party left Chapongah, accompanied by the good wishes of their kind hostess, to whom Mr. Kilpatrick,

at parting, presented various papers of medicine, valuable in such a secluded part of the world. The Donna readily returned the courtesy by a small token of remembrance to each, and an ample supply of all kinds of provision for their journey. The river was nearly a mile in breadth, but the channel was almost choked up with sands, and though the banks at times were of rock formation, rising perpendicularly twenty feet above the water, yet the great deposit on them of dead reeds and drift timber evidently showed that during the rainy season they were overflowed. At times the northern side appeared covered with palm and other trees; and as they ascended they had a view of the picturesque and distant mountains of Yemale, which even from its novelty was pleasing and interesting, but especially as they connected with it the idea of a more propitious climate. The morning of the 12th was unusually damp and cold, and the thermometer, which never before had stood below 70°, fell to 62°. Mr. Forbes was sensibly affected by the change, and his companions began to regret that they had not left him at Chapongah. In the afternoon they dined, by invitation, with a mulatto, who resided on the northern side*, at whose house they found a company of strolling players, exhibiting various theatrical performances, as also feats in tumbling. The chase of a man by a lion constituted one part of the entertainment. The latter character was enacted by a native dressed out most formidably with a horrible mask and skin. The plot was as follows:—The man, after a long run, reaches a tree, ascends it, and endeavours to conceal himself among the branches, while the lion, after many awkward attempts by springing up to seize him, crouches down below to watch his descent; the man loudly calls for help; a hunter cautiously approaches; the lion is killed, and the scene ends by loud exultations at the monster's death, and the consequent release of his intended victim. Three drums constituted the band. Mr. Browne, in his journal, describes the habits of his boatmen in nearly the following words:—As soon as the tents were pitched at night, they took the poles with which at times they impelled the boats along, and, sticking them in the ground across the direction of the wind, wove mats between them, thus forming a screen to shelter themselves from the chilling coldness of the night breeze. Under this shelter, which they made to slope a little, a fire was kindled, around which they huddled together in various postures, warming themselves thoroughly for the night, and taking red-hot embers in their hands, without appearing to feel any other sensation than that of a pleasing warmth. Whilst they were cooking their supper of grass porridge, in small earthen pipkins, they sat crouching over the fire in the highest good hu-

* This in all probability is a mistake, the northern side of the river being possessed by savages inimical to the Portuguese.—W. F. W. O.

mour, loud in their converse and mirth, and presenting a most grateful sight of contented cheerfulness, under such indifferent circumstances: in fact, the little encampment, from the time of its forming until midnight, was one continued scene of mirth and festivity, which Lieutenant Browne, while taking observations of the stars, often sat and viewed, enjoying at once the novelty and soothing effect on his own feelings. The manner these people slept was extraordinary. Each had a large sack, in which, as soon as he felt inclined for repose, he coiled himself up; and the ludicrous scene was thus often exhibited of two sacks in deep and earnest converse with each other, no motion whatever indicating their living contents. The plan is an excellent one to escape the annoying bites of the mosquitoes. The laziness of the subaltern, who after having often had eleven hours sleep during the night, still continued to slumber in the forenoon, was on a par with that of a wretched being of half Portuguese and half Malay extraction, whom they met at a small village previous to their arrival at Marooro. He had scarcely a rag to cover him, yet to strike our travellers with an idea of his importance, he was highly solicitous to impress on their minds that he did not work, but slept all day, the negroes labouring for him in his occupation, which was that of curing fish.

On the northern side of the banks of the river the country now began to swell up into the hills called Yemale, before alluded to, the highest being not less than eight hundred feet, partially wooded, and having a very imposing appearance. The territory on that side, as far down as Marooro, is exclusively in the possession of free blacks, not at all under the jurisdiction of the Portuguese, whose possessions are entirely confined to the southern side. The people are warlike, and often engaged in broils with the Portuguese. Some are armed with muskets, some with assagays, and others with bows and arrows.

On the 15th the party passed these hills of Yemale, when those of Mirambole (probably Morumbola) appeared in a large mass, stretching to the north-west: their height was estimated at two or three thousand feet; they were covered with forests and furrowed by deep ravines. It is needless to enter into an account of each day's tedious ascent, especially as the general appearance of the river did not vary, nor did any occurrence take place worthy of remark, until the morning of the 16th, when Mr. Forbes breathed his last. The death of this deservedly esteemed young man was a severe blow to the survivors, for besides the services which from his attainments and perseverance he was qualified to render to the expedition, he possessed an extremely mild and agreeable disposition; and the melancholy termination of his illness could not but produce a gloomy impression on the minds of those who survived

him. As they were within a day's journey of Senna, a dispatch was forwarded overland to that place to bespeak a coffin and funeral preparations for the deceased. The river for some days past had abounded with alligators, who often, to the number of fifty or more, were observed basking in the sun on the sand-banks ; at night too the cries of the wild beasts in the forests were generally heard, especially of lions, which, they were informed, were in great numbers. The night that followed the demise of Mr. Forbes, brought but little sleep to the party; for, besides the disagreeable reflections, which at times they could not banish, they were assailed by myriads of mosquitoes, and chilled by the dampness of the air occasioned by the heavy rains which had fallen during the preceding day. It was past seven o'clock on the next evening before they arrived at Senna. On landing they were conducted to the house of the commandant, where, as he was not at home, they had to wait upwards of half an hour, subject to the gaze of a host of Mulattoes and Kannareens, who had assembled to gratify their curiosity. At last, when the patience of the travellers was nearly exhausted, they were summoned to the presence of the commandant at the house of the only priest in the town, who jointly with him kept but one table. The contrast between the two was striking : the priest, apparently a European, had a disagreeable and crafty expression of countenance, while the commandant exhibited, in his darker tinge of native colour, a kind look and pleasing manner. Lieutenant Browne stated the object of the expedition to the commandant, who, after he had listened to it, assigned him a residence, and agreed to call next day, in order to read such letters and public documents as he had been furnished with respecting the prosecution of his journey through the Portuguese possessions. The house that was thus allotted to the party had been occupied by an officer of high rank, lately deceased ; it was of the largest description, which, together with its being left unfurnished, rendered it very comfortless; besides, it had a most fœtid smell, which defied to the last their constant attempts by gunpowder fumigations to overcome it. Next morning they proceeded to the church, to attend the funeral ceremony over the grave of their deceased companion, whose corpse, from the highly putrescent state it arrived in, they had been obliged to inter over night; and, on their return, were glad to relieve the disagreeable nature of their thoughts by a walk in the environs of the town. Bending their steps towards a diminutive mud redoubt, surmounted by two small field pieces, the only defence of that kind at Senna, they afterwards passed through an assemblage of huts, considerable in number, but by no means more so than those at Quillimane. There were ten houses in which the Portuguese dwelt; yet inconsiderable as that number was, they comprised the whole that had any European appearance

about them. They were of large dimensions, and resembled those of Quillimane. They passed over the plain on which the town stands, amid a forest of tamarind, mangoa, and cocoa-nut trees, and bent their steps towards two small hills, rising at a short distance in the background. As they proceeded to ascend one of these, the coarse gravelly nature of the ground was superseded by the rocky formation of the hill; it was a species of schistus, blended with small fragments of sandstone. From the summit, elevated above one hundred and fifty feet above the plain, the prospect was extensive, and comprised a view of the houses and huts of Senna, interspersed with filthy stagnant pools, as demonstrative of the unhealthiness of the place, as they were of the idleness and sloth of the inhabitants. The river, as far as the eye could discern, winded majestically through the plain, studded with sands, and with its rapid summer torrent in narrow channels passing between them. To the north-east the country presented a mountainous aspect, while to the southward it was flat, with the exception of two or three small hills resembling the one they stood on: these, as well as the low-land, were covered with a parched vegetation, and trees of a stunted growth.

Quitting now the travellers for a short time, such an account will be given of the city and province of Senna as the materials collected will admit of; the most important of these being a manuscript memoir, written by Señor Terão, governor of the district of the Rios de Senna, a young man of much promise, who, shortly after he wrote his memoir in 1810, was assassinated by one of his own officers.

The Captaincy of the Rios de Senna is bounded to the east by the sea; to the south by the mountains of Sofala; and westward its limits pass through the kingdoms of Quiteve and Barne, including the countries between the empire of Monomotapa* and the Zambezi. To the north the Zambezi is its principal frontier, only the province of Quillimane, on the coast, being beyond that river. The whole is included between 15° and 20° of south latitude, and 27° and 37° east longitude from London; and on a vague computation, contains about three thousand six hundred square leagues of territory.

The population is composed of three classes, viz.:—1. The Whites and free Mulattoes, who pay taxes;—2. Slaves;—3. Free Negroes, for the most part settled on the lands. Very few data exist from which a calculation can be made of the numbers of each,

* Accounts disagree so much in the limits assigned to the empire of Monomotapa, that it is impossible to derive from them a consistent result; and at the present day it appears to be but a geographical division, comprising countries independent of each other.—W. F. W. O.

but in 1806 the first class was not supposed to exceed five hundred; the registered births among whom the preceding year, had been thirty-six,—the deaths, thirty-two,—and the marriages, six. The number of slaves in the same year, as registered, was twenty-one thousand eight hundred and twenty-seven; of whom, however, ten thousand eight hundred and sixty-seven were reported absent, or, in other words, had deserted, and sought refuge among the free black tribes in the neighbourhood. Of the third class, viz. Free Negroes, it was impossible to form any estimate, although they were believed to be much more numerous than the other two together. They varied according as wars among the neighbouring tribes drove them in, or famine in turn expelled them, being, for the most part, settlers only so long as suited themselves; but they provide a constant and ample supply of free labour, which contributes, with the indolence of the European settlers, to cause the indifference with which the desertion of the domestic slaves is regarded.

Within the province the dominion of the Portuguese is very firmly fixed, although they are frequently at war with the conterminous tribes; and the slaves and free negroes are both honest and docile, to a degree which seems to have surprized our travellers. Nothing can be more deplorable, however, than the sloth, ignorance, and indolence in which they are all alike sunk,—the causes of which are many. The country is so exuberantly fertile, that a very small amount of labour is sufficient to satisfy all wants. The estates are so large, that no interest is taken in their cultivation. Agriculture is thus so neglected, that even famines are frequent in the remote districts. The chief employment is trafficking with the neighbouring tribes for slaves, ivory, gold-dust, and even frequently provisions. And the priests being paid with gifts, tendered on occasion of a variety of superstitious ceremonies, are excessively jealous of every attempt at instructing their flocks. One of their own number even, who opened a school at Tette, was suspended in consequence by his superior, and removed.

The town of Senna has been already described: it is situate in lat. 17° 30′S., long. 35° 38′8″ E., according to Lieut. Browne's observations. It is the capital of the whole province, though smaller in extent than Quillimane, and inferior both in healthiness of situation and activity of population, to Tette, which is said to be sixty leagues higher up. Besides these three towns there are other stations, as Manica, Chicoree, Zumbo, &c., the last of which is said to be an island in the Zambezi, eighty leagues above Senna. The whole navigation of the river is stated at three hundred leagues, but this is probably exaggerated. Many considerable rivers flow into it at different points of its course, one of which, the Shirry, was ob-

served by our travellers below Senna, and, as was said, is deep, and can be ascended in boats for thirty days. Its stream, where it joined the Zambezi, was very rapid.

The natural productions of the country are of every tropical variety; but those cultivated are few in number, viz. rice, wheat, sugar, cotton, millet, tobacco, legumes or garden vegetables, and a few medicinal plants, of which the ricinus and other oily plants, euphorbia, rhubarb, jalap, and senna, are the chief. A variety of cotton is mentioned of a deep scarlet colour, but whether this tinge is natural to it, or occasioned by disease, is unknown. Indigo grows wild like a common weed. The articles which form the commerce of the country belong chiefly to the animal and mineral kingdoms: viz. hippopotamus teeth and oil *, elephants' tusks, rhinoceros horns, tiger skins, honey and wax, gold-dust, (principally from Quiteve, Manica, Majizuros, Abutica, Zumbo, Mesconga, and Mano, and could be extracted in any quantity from the crown lands,) copper, iron, saltpetre, and common salt. The copper is chiefly procured from the provinces of Zumbo, Mongas, and Cazembe; the iron from the district of Senna, and by traffic from the Maraves, who are very dexterous, also, in manufacturing it; salt and saltpetre are distributed everywhere.

The foreign trade of the province is very trifling, notwithstanding its many advantages; and there is not, in consequence, even a custom-house at Quillimane, every article of export and import being obliged to pass through Mozambique. In 1808 the total value out was 1,090,420 cruzadoes, distributed as follows:—gold, 100,000; ivory, 525,000; slaves, 192,000; rice, 112,000; wheat, 61,420; miscellaneous, 100,000. (The value of the thousand cruzadoes varies from thirty-five to fifty pounds sterling.) The returns inward during the same year were—

Bars of coloured cottons, (each bar containing four hundred pieces, and each piece thirty-one yards)	611
Barrels of beads	50
——— wine	61
——— aqua ardente	10
Cases of ditto	16
Sugar (cwt.)	34
Tubs of sugar-candy	6
Annaida-fogo, or fire-rings	270
Gunpowder (cwt.)	33
Soap (cwt.)	8
Barrels of salt meat	8
——— butter	8

* Possibly extracted for medicinal purposes, otherwise the small quantity, if any, which the animal could yield, would not repay the trouble of procuring it: but I rather think that it is a mistake.—W. F. W. O.

Barrels of salt fish	9
Pewter (cwt.)	8
Pitch (cwt.)	4
Corn (sacks)	29
Bundles of lavender	2
Cases of earthenware	1
Ditto of glass	2
Boxes of tea	8
Packages of chocolate	6
Ditto of coffee	8
Kegs of sweet oil	7
Barrels of oil	6

Many of the articles imported ought, in truth, to be exported; and with all the indolence of the inhabitants, it is scarcely conceivable that there should be a deficiency in their internal supply.

The revenues of the province are, first, those arising from custom-house dues paid at Mozambique on its foreign trade, which are placed to its credit; and second, those arising from the fines and tenths paid on the crown lands. From the limited extent of the foreign trade, the amount of the first is obviously insignificant;—that of the second, due in 1808, is stated in Señor Ferao's Memoir to have been as follows:—

	Cruzadoes.
48 Crown Estates in the District of Tette, which pay, in fines and tenths	708,522½
6 Exchequer Estates in ditto	56,077½
27 Crown Estates in the District of Senna	1,527,917½
4 Exchequer ditto in ditto	97,375
13 Crown Estates in the District of Quillimane	421,441½
2 Exchequer ditto in ditto	88,666
Total	2,900,000

or about twelve hundred thousand sterling. Leases of crown lands can only be given for three lives, and by law must descend to females, who are required to marry native Portuguese. And hence it was that Doña Pascoa, the kind and liberal hostess of our party, was the widow, and had been the wife, of an officer of high rank, only recently deceased, but from whom she had been many years separated.

In 1808 the regular Portuguese force maintained in the province amounted only to two hundred and sixty-four men, of whom seventy-two formed the garrison of Quillimane; forty-nine that of Senna; ninety-four that of Tette; thirty-seven that of Zumbo; and twelve that of Manica. The relative position of these latter places is only known from the report of the Portuguese at Senna and Quillimane, the sum of the information derived from whom is as follows:—

As already noticed, Tette is situated sixty leagues beyond Senna, but the time necessary to perform the journey differs much, as the rapidity of the current in the river, always difficult to surmount, is at times so much augmented by the rains in the interior, that travellers in their canoes are often delayed two and three days without being able to proceed : six weeks they account a fair passage. The town is described as exceeding in size both Senna and Quillimane, and not built like them on a low marshy spot, but in an elevated, mountainous district, with the Zambezi flowing beneath it ; hence its celebrity for health and beautiful picturesque scenery. The country around is fertile in the extreme, yet often suffering, and at times almost reduced to a desert state, by the restless and quarrelsome disposition of the surrounding tribes of Moizas and Maraves, the latter of whom are almost constantly engaged in war with the Portuguese.

The village of Chicora is stated to be fifteen days' journey beyond Tette, and that of Zumbo five more ; Manica eight from Sofala, thence inland eight again to a large town called Barne, which is situated at the distance of fifteen days' journey from Tette. This route from Tette to Sofala, however, is not straight, as Barne lies a long way in the interior ; but from Senna there is a road to Sofala, passing nearly in a line through Maccai. Half way between Senna and Manica there are mountains of marble, from which many rivers flow, abounding in alligators and hippopotami. From Manica a river passes to the southward, but where it flows to is not known, although it is conjectured to be the Manice. The Zambezi, after passing Chicora, most probably beyond Zumbo, takes a sweep round towards Manica. The gold about that place is found pure in the alluvial soil, and the iron by excavation, the mines running horizontally into the mountains. The ore when extracted is melted into bars for sale.

Returning now to our travellers,—on the 19th August Mr. Browne received a visit from the priest, who brought with him his bill for Mr. Forbes's funeral, amounting to the exorbitant sum of one hundred and twenty-seven Spanish dollars ; and without enumerating all the mercenary and other odious arts of this man, it may suffice to say, that he thus strove in every way to extract money from the party, thwarting their views, annoying them by his insolence, and by these means, without doubt, contributing greatly to their death, and the consequent failure of the expedition. (Nor was his conduct in other points less culpable.) He was shortly joined in his visit by the commandant, who, evidently at his suggestion, stated that he did not consider himself authorised, by the governor-general's order from Mozambique, to make the expedition a government undertaking ; on which Mr. Browne protested against such conduct,

declaring that he would make him responsible for the hindrance thus offered to the prosecution and success of the expedition; and this had the effect of creating alarm, and inducing the commandant to request a copy of Mr. Browne's orders, that he might consult at leisure about opening the government stores to him. But the delay and uncertainty thus occasioned, together with the death of their companion, seem early to have had an injurious effect on the spirits of the party, and a very short time concluded the scene.

On the 27th of August, Mr. Browne, who had already several times experienced slight attacks of fever, was taken more seriously ill; and his journal terminates on the 2d September. He appears to have died about the 4th. Adonis and Antonio were next seized, but recovered. Mr. Kilpatrick was attacked on the 1st September; and although he lingered a considerable time, and permission was eventually granted him to proceed to Tette, his spirit gradually sunk, and he returned to Chapongah, on his way down the river. He was here again hospitably received by Donna Pascoa, who renewed her efforts to persuade him to try the country method of cure; but instead of this, although his habits had been previously abstemious, he sought comfort and consolation in excesses, which terminated his life on the 28th October. He was faithfully attended to the last by the two black servants, who, after his death, returned to Quillimane, and were re-embarked.

During the first three or four days after the arrival of the party at Senna, light winds prevailed from the north-east, and the thermometer varied from 70° to 76°. One night it stood at the latter at twelve o'clock. The wind afterwards changed to the south-west, with intervals of calms, but the thermometer averaged nearly as before. The sensation of heat, however, is represented to have been always greater than might have been expected from the indications of the thermometer.

X.—*Remarks on Anegada.* Communicated by Robert Hermann Schomburgk, Esq., Member of the Horticultural Society of Berlin*. Read 25th of June, 1832.

ANEGADA, or Anagada, is the most northern of the cluster of islands and keys known by the name of the Virgin Islands, and is unhappily celebrated for the number of wrecks, in many cases accompanied with a heavy loss of life, which it has occasioned.

* Mr. Schomburgk is now travelling in the West Indies; and being at St. Thomas's when the Lewis, American brig, was wrecked on Anegada, resolved to re-survey it. The above remarks, with the accompanying map, are the result of his observations while thus employed; and he has also completed a detailed chart of the reefs, with the soundings between them.

Of its history little is known; and there is no likelihood that it was settled early. Père Labat, the only early writer who speaks of the lesser West India islands, observes, that the aborigines used it as an occasional rendezvous, where they procured great quantities of conchs (*strombus gigas*); and large piles of these shells are still to be seen at the east end of the island, but nowhere else; which seems to prove decidedly that it was not permanently occupied, but merely resorted to from time to time. These conchs are still found in great numbers in the shallow waters at the east end, chiefly in the months of May and November; and the dry shells piled up have all a hole in the lower end of the spire, for which the most probable reason is, that the animal is thus most easily extracted. It appears surprising that so much care should have been taken to pile them up, and it has been surmised, in consequence, that these heaps were burial-places; but several have been taken down, and burnt for lime (the quality of which is excellent), without any trace having been found of human bones, or other extraneous substance. And it is more probable that they were merely piled up to be out of the way, the current not being strong enough to carry them off had they been thrown into the sea; where, had they remained, they would have embarrassed the fishing for the living animal.

At a later period the retired bays of the island served as a lurking place to the Buccaneers, Kirke and Bone being said to have especially frequented it; and the latter has bequeathed his name to a creek on the north side, which appears to have been his favourite resort. Ultimately, as the trade among the West India islands became more frequent, and repeated shipwrecks in this quarter held out hopes of advantage to those who might be in the neighbourhood to profit by them, settlers took up their permanent residence on the island, and were, at one time, more numerous even than they are now. They found that the loose ground which covered it was capable of bearing provision crops, and even cotton; while the rearing of stock, and sale of the underwood, which was progressively cleared away, and which, being very full of gum, had a preference in the market of St. Thomas', furnished a further resource. The great object, however, always was, and still is, the wreck of vessels; and the indolence of the inhabitants is only thoroughly roused by the cry of—'A vessel on the reef.' Then all are roused to activity; scarcely is the news announced, than boats of every description, shallops and sailing vessels, are pushed off with all haste towards the scene of action; arms which have been idle for weeks are brought into exercise; and both skill and intrepidity are tasked to the uttermost to get first on board. The scene, indeed, baffles description; and it is to be feared that few are attracted by motives of humanity, though

some such do exist; for the name of Mr. Gildersleve, in particular, must ever be mentioned with respect and gratitude by all who have visited, or been driven on, Anegada.

The surface of the island is the production of the industrious tribe of *lithophytæ*, based (it may be presumed) as usual on a submarine elevation; and, as it has been supposed that the West Indies have been detached from the Floridas by an irruption of the ocean, the whole may be considered as a chain of mountains projecting from the American continent.

The soundings between Virgin Gorda and Anegada are tolerably regular, being from 6 to 16 fathoms; and there is, therefore, no doubt that the two communicate, and form parts of one system. But their nature is quite different; primitive rocks predominating in the former, while, in the latter, we find only layers of limestone and coral. Shall we conclude, therefore, that Virgin Gorda owes its existence to volcanic action, while Anegada has only been raised progressively by the labour of the madrepores? No fragments of coral rock are found above a certain height in Virgin Gorda; where, on the contrary, a particular kind of granite rises in huge masses, and is very peculiarly arranged at a place called 'The Bath.'

The direct distance between the two islands is 11⅜ nautical miles; and the appearance of Anegada, when approaching it from this side, viz. from the south-west, is remarkable. First, single trees show themselves on the horizon; then the most elevated part of the island, called Frank's Landing, which may be distinguished, in clear weather, about 8 miles off; and, last of all, the lower land. The lead usually brings up pieces of coral rock, with coarse sand and broken shells. The greatest depth of water is near Virgin Gorda. At eight miles distance from Anegada there are from 8 to 11 fathoms, decreasing, as the shoals are approached, to 4 fathoms. The outer edge of the reef is marked in some places by the water breaking; in others, merely the brown heads of the rocks, contrasted with the white colour of the bottom where clear, indicate the danger. Considerable skill is requisite to pass through the openings; but inside there is good anchorage in 2½ fathoms, about a mile from the beach. Vessels drawing more water anchor outside, in from 4 to 6 fathoms.

On landing, the beach is found everywhere coated with a grey, siliceous, and calcareous substance (the predominant ingredients in which are clay, fragments of limestone, and vegetable fibres), which seems to be deposited by the waters; and as the tide retires, hardens, and assists slowly in increasing the island. This substance is not, however, to be found on the northern side, where the impetuosity of the surf prevents its being left, and where, accordingly, the land does not gain on the water, as it does along the

whole south shore. But there can be little doubt that, excepting thus on the extreme weather face, it once covered the whole island; the impression of feet and birds' claws being distinctly visible in many places, now overgrown with underwood and grass; the first being believed to have been left by the Indians on their occasional visits already noticed, the other being recognized as those of birds which still frequent the island. And if the question is asked, how is this substance formed? it appears obvious that its matter is the *detritus* of the current which sweeps this sea in a W.N.W. direction, and of which I shall afterwards speak at greater length, while it probably receives its binding nature from the gluten which we find adhering to the mouths of the zoophytes.

The greatest length of Anegada is, from E.S.E. to W.N.W., 10.07 English miles; the greatest breadth 4.25 English miles, which is between Pearl Point and Soldiers' Wash; thence it diminishes towards both extremities, so that the average breadth cannot be stated to be more than 1.33 miles; and the whole circumference, ingresses and egresses included, is 23.09 miles (1846 chains). The surrounding reef approaches nearest on the north side of the island, where, at a particular point, (in Diego Bay,) it joins with the shore. Generally speaking, indeed, the distance of the reef on the northern side is but inconsiderable; and the same may be said of the western, and partly of the southern side. Its greatest extent is to the south-east, and its most southern extremity, from the east end of Anegada, is nearly the same distance as the west end from the same point, namely, 7.68 marine miles; —the distance of the reef on the south side is from 1 to 4½ miles. On sounding close to this natural barrier, on the southern and western side, a depth of from 4 to 6 fathoms is found;—on the northern and eastern side from 6 to 9 fathoms; but at a distance of 1½ miles, in a northerly direction, I found no bottom at 100 fathoms. Inside of the main chain of shoals, the depth of water varies very often, of a sudden, so that it is only with great skill and attention that a small sloop can be navigated from E. to W., and *vice versa*, and this only on the southern side;—on the north side it is quite impossible, as the reef stretches to the shore. There extends from the west end, in a south-westerly direction, almost to the eastern end of Jose van Dykes, a shallow ground, and, as the bottom is mostly whitish sand, it appears of less depth than it is in reality. I found not less than 7 fathoms on it*.

The main reef to the north is occasionally interrupted by

* Among the superstitions of the inhabitants prevails the tradition, that this ground, known by the name of the Middle Ground, rises once a-year from its depth to the surface of the water.

channels, which lead to spacious places for anchorage; but though at the entrance they are 4 to 5 fathoms deep, the basins themselves are often obstructed by shoals, which raise their heads to the very surface of the water. We find these channels,—but of an inferior width,—along the whole surrounding reef; the smallest are on the south-eastern main reef, where there are only two or three which might be passable for vessels of smaller description; they are nevertheless so obstructed that only necessity will induce a vessel to pass through them. I passed, during my survey, through the channel called the Mary Channel, and have still to admire the firm and ready hand of the helmsman, tide and wind being both against us; and we were often so surrounded by shoals, that I thought it impossible to escape without injury.

At a distance of about two nautical miles from Man-of-War Point the southern reef joins the main reef; it has been called 'The Longshoal,' from the density of the beds, which, for a considerable distance, form almost one entire mass. Thence the shoals become, with the exception of the main reef, more detached; the latter stretches to the south-east till it reaches the Elbow, or extreme south-eastern end, when it turns gradually to the south-west, forming almost a half circle, known by the name of 'The Horse Shoe.' The depth of water increases from this towards the east end of Spanish Town; but there are still some dangerous shallows in the way, with only 3 or 4, nay, even 2 fathoms water.

Having given an outline of the environs of the island, I approach now to the terra firma, if the hollow productions of the madrepore, &c. can be so called. To one who visits this strange spot for the first time, and who, accustomed to see hills and mountains, looks anxiously for such elevations, the effect is disappointing; for the surface is, for the most part, a dead level, with only occasionally a turpentine or loblolly tree overlooking the underwood. However, on the south-eastern side, the ground does rise gradually, from north to south, about 60 feet, which is the highest point of Anegada, and commonly called 'Frank's Landing.' Next to Mr. Gildersleve's habitation is another elevation of the ground, but inferior in height; and there is one more, still smaller, near the settlements. It has been ascertained, indeed, that, as soon as the *lithophytæ* have reached the surface of the water, they stop their work; consequently such formations must be always nearly level.

The southern side of the island is a continued mass of shelves, loosely covered with vegetable earth, more or less mixed with sand. This mould is doubtless the decomposed matter of algæ, which, through exposure to the sun, have lost their saline property, and form a most excellent vegetable earth;—it is light

and of a dark-brown colour, and leaves on the tongue a somewhat acid taste. It is so lightly settled on the shelf, that it often covers the ground only for a few inches. The lithophytæ do not build in compact masses, and the shelves are therefore intersected with openings, sometimes narrow, sometimes of considerable width and depth; indeed they stretch now and then for a considerable distance under the shelves, and a deep hollow sound, when going over certain places, proves that they are undermined *. A great quantity of sea-weed having been deposited in these crevices at the time the sea washed over the island, and the decomposed matter being increased by the detritus of the current, and, at a later period perhaps, by deposits from rain torrents, such a shelf-hole possesses a good stock of excellent soil, and produces usually a large growth of plants, which distinguish themselves by their healthy and vigorous appearance. The only trees which the island possesses grow out of these holes, where they find not merely sufficient nourishment, but their roots take so firm a hold, that the north wind, which sweeps with great velocity over the island, does them no injury †. It has been observed, that after having dug about 5 feet in the shelf, layers of sand are occasionally found mixed with minute shells, such as are still to be met with on the bays, another proof that the marine animalcula do not build compactly;—the sea rushing through the openings fills the empty spaces with sand.

The western end of the island has been covered with sand, forced forward by an immense ground sea or surf, to which it is still subjected from time to time, and hence the continual change of the figure of the bays in that part. I observed the same vegetable earth below the sand; and if, therefore, the root can pierce through it, it will find sufficient nourishment to give the plant or shrub a healthy appearance. The whole northern side is exposed to an impetuous sea, but mostly on the north-western part, where the sand has formed little hillocks of 40 feet in height. Behind the first range is a second, and even a third;—all of which are now covered by a species of Arundo and the Suriana maritima. After these little hillocks have stretched for some miles in an easterly direction, the shore takes a rocky appearance, and, instead of sand, detached pieces of limestone and coral are heaped up, which reach even a height of 30 feet and more. The productive soil lies chiefly behind these rocky hillocks, (perhaps by

* When a flock of sheep pass over such a place, one imagines he hears the roaring of thunder.

† Mr. Gildersleve has planted several cocoa-nut trees in such shelf-holes, of which two have reached a considerable height, and, being the only ones in the island, serve as an excellent land-mark when coming from Virgin Gorda; they are, therefore, noted in my Chart of Anegada.

reason of the protection,) and is cultivated by the inhabitants to raise their crops. On approaching the eastern end, sand-hills begin to rise gradually again, till on the southern side the bays become almost level with high-water mark. The sand is so exceedingly fine, that it can scarcely be used for mortar.

The ponds of Anegada form an important feature in a description of the island;—those towards the west are of the greatest extent. Flamingo Pond has several small isles, which possess a more vigorous vegetation than the surrounding banks, and resemble oases in a desert;—they are chiefly adorned with the *Bignonia leucoxylon*, which, when in flower, heightens their interesting appearance. These ponds form, on the south side, a junction with the sea; and there was likewise one on the northern side, but the hurricane of 1819 stopped its passage. They are consequently subjected to ebb and flood, which would lead to the supposition that the height of the water in the ponds depended on the state of the sea, whether rising or falling; but it is not so,—a rise or sudden decrease often taking place without its being possible to assign any reason for it. The surrounding banks of the ponds are in general 2 feet higher than the surface of the water; but sometimes this accumulates so suddenly, that it overflows and inundates the whole southern side, while at other times, again, it falls; which seems not merely to be caused by evaporation, but by an absorption through the lower strata. The evaporations of the ponds are, during this time, unhealthy, and the effluvia arising from them scarcely to be borne.

A long continuance of dry weather, however, always lessens the quantity of water considerably; and when this takes place during the month of August, a large quantity of salt may be obtained from some of the ponds. I have seen a small pond on the eastern side of the island, the area of which was scarcely more than 1½ acres, which, for a space of time, produced annually 1500 barrels of salt; but for several years it has yielded nothing, probably owing to its neglected and filthy state. Flamingo Pond has also made large quantities of salt, but, of late, for the same reason, has scarcely given any thing. At the period when the salt is forming, white masses, like clouds, are visible below the surface of the water, which in time appear to rise higher, till the water that covered them is entirely evaporated and absorbed, when the salt is carefully taken up and put in barrels and bags. The usual price per barrel is about one dollar; but, in consequence of the present scarcity, this is raised to two and a half and three dollars.

The bottoms of all these ponds are shelfy and uneven, with heads of coral rocks often rising in them above the surface of the water, which is especially the case in a pond to the northward of Mr. Gildersleve's habitation, where not only are larger masses of

coral to be observed than elsewhere, but the banks also rise higher. An example of a different kind is to be found in a small pond west of Salt Pond, the bottom of which sinks, and has, occasionally, caused the loss both of men and cattle. This must be owing to a great quantity of vegetable matter accumulated there, the upper stratum being by no means a quick-sand, and I scarcely could discover even the presence of sand in a large quantity of the matter which forms its unsolid ground. There appeared rather to be the same substance present which I mentioned as having covered formerly the whole island. In the vicinity of White Bay there is also an elasticity of ground, so that it sinks when the foot is placed upon it, and rises immediately on the pressure being removed.

Fresh water is found in great abundance on almost every part of the island, frequently even in the immediate vicinity of the sea, and surrounded by salt-ponds. On the north side, near Loblolly Bay, are a range of shelf-holes, called 'the Wells,' which are filled with fresh water. Fabulous accounts were formerly circulated respecting the great depth of these shelf-holes; but I sounded those most famed, and the result was—6 fathoms, 5½ fathoms, 2½ fathoms, and 4 fathoms. The taste of the water of these holes, though they are not far distant from each other, is not alike,—the one which is 6 fathoms deep, possessing much more the taste which is given to water by minerals than those of a lesser depth; and I have therefore no doubt that it has its origin below the layers of limestone,—in which opinion I was confirmed when I procured, by repeated soundings, gravel from the first and second, but coral and broken shells from the two latter, and several others of the like depth. To the northward of Mr. Gildersleve's is a similar shelf-hole, with 2 fathoms water, called 'Lilly Well,' the water of which has by far the most agreeable taste. The formation of these shelf-holes is curious,—the mouth is usually from 10 to 25 feet wide; and they descend in the form of a funnel. Have their sides been formerly perpendicular, and has the action of rain washed the upper layers and given them their present funnel shape? or has it been caused by volcanic eruptions? The water contained in them is said often to rise to an uncommon height, as though forced up by some pressure from beneath; but, in general, they ebb and flow with the sea.

The filtration of water through the surface soil, and its being thereby deprived of its saline particles, takes place in a very short space of time; as, for instance, on the north side of the island, a hole has been dug in the sand, called 'Cow-wreck Well,' which is filled with tolerably good water, though the distance from the sea is only 130 feet, and in the immediate vicinity there are salt-ponds. While encamped one night at the west end of the island, I observed a further proof that almost an instant filtration takes place. After

having finished my day's work, a hole was dug in the sand to procure fresh water, and it gushed out abundantly; but in the morning, to my great regret, a spring tide having inundated our well, the surf had filled it with sand; and this was the more inconvenient as the next spring was rather distant. How agreeably then was I surprised when the people, who assisted me during my survey, told me it was of no consequence, as the sand need only be removed and the water would again flow as fresh as the evening before,—and this proved correct. A little inland, at the west end, fresh water is thus peculiarly abundant; and as there is good anchorage in the vicinity, whole fleets might be provided with any quantity they required. I have been also told that the water does not spoil by keeping.

Near one of these shelf-holes the marks of feet were pointed out to me, which, from their form and the outward turn of the toes, are considered to be those of Indians. Mr. John Vanterpool, who has passed the great climacteric, recollects having seen them on his first visit to the island, when the oldest inhabitants also remembered them from their infancy; and there is therefore little doubt that they have been left by the aborigines, who must have visited the spot when still covered with the soft glutinous matter already alluded to. The thermometer, when put in the water of these shelf-holes, indicates usually a temperature from 5° to 8° below that of the atmosphere, and 3° to 4° below that of the sea.

One would suppose that the climate, considering the low situation of the island, and the effluvia which escape from the ponds, would be unhealthy; but the examples of longevity prove almost the contrary. It is observed that, within the last ten years, the island has not been so healthy as it was formerly; and perhaps the present advanced age of the inhabitants has made them more sensitive under changes of weather*. As soon as the rainy season sets in, and the lowest parts of the island are inundated, fevers and influenza prevail. It is remarkable, that not a single case of elephantiasis is at present on the island; nor is this complaint known (as I was told) to have ever attacked an individual born there, notwithstanding their occupation, which compels them to be much in the water.

Fogs, equal to those which we have on the continent, rise here very suddenly; and I was myself witness of one which caused a considerable consternation among the inhabitants, the cry having

* There is a notion prevalent among some of the inhabitants, that the island had been less healthy since the mosquitoes had ceased to visit it in such large clouds as before 1819; but as it appears that they returned, in 1831, in as great numbers as ever, those who entertain this opinion may hope that this effect, or concomitant, of their departure, may also cease.

been raised that the sea had come over the land from the north side. And, certainly, the appearance was appalling enough, large masses of white fog rolling heavily over the land, and approaching from the north; nor was I surprized that it had been at first taken for the sea.

In calm and clear weather, and chiefly at high water, objects at Virgin Gorda, which, at other periods, are entirely invisible, seem to rise above the surface of the water, leaving apparently a vacancy between; and trees, rocks, &c. appear, accordingly, to hover in the air. In cloudy weather, or when the sea was agitated, I never observed this curious refraction.

It is well known that the West India islands are subject to severe earthquakes; but Mr. Gildersleve, who has lived for the last twenty years in Anegada, and who is a man of great respectability and veracity, assures me that he recollected but very few there, and those slight. A heavy shock was felt in October, 1830, in Tortola, Virgin Gorda, St. Thomas, &c., of which nothing was known in Anegada; and, on another occasion, a shock, which we experienced on the 23d of April, 1831, in Anegada, was not felt in Tortola. Shall we conclude that this occurrence was only accidental? or if the contrary, and that these shocks, felt in common at the Virgin Islands, do not extend to Anegada, shall we not be obliged to doubt that submarine communication between them, of which we have otherwise proofs? The true solution must be, that the subterranean fire, or rather the elastic vapours, find no additional assistance in Anegada. The thermometer stood on that day at 12 o'clock, 84° 05″, and fell, during the shock, at 2 o'clock, to 78°.

I subjoin the result of thermometrical observations, kept during the months of April, August, September and October, 1831; and add, for comparison, some others made during the same time in the town of Tortola*. The mean temperature being greater in Anegada than in Tortola, may be attributed to the calcareous soil and the low sandy bays of the former island.

The vegetable productions of Anegada are, in some respects, singular. I have found several species of Malpighia, Mimosa, Eugenia, Croton, Agave, Epidendrum, &c., which I did not observe in any of the other Virgin Islands. These plants appear to be distributed in regular tribes; we observe, therefore, some on certain places, which appear to have chosen these spots exclusively, and are not to be met with elsewhere. This is the case with Malpighia angustifolia, which is in great abundance about the set-

			Anegada.	Tortola.
* Mean temperature of the month of		April 1831,	78° 8′	77°.
Do.	do.	August	83° 1′	82°.
Do.	do.	September	83° 6′	82°.
Do.	do.	October	81° 9′	80°.

tlement, but neither farther east nor west. Malpighia urens occurs further to the west, where there is likewise another species (perhaps coccifera), the berries of which are eaten by the children; these two are chiefly near and about Mr. Gildersleve's habitation. A small spot, almost surrounded by the ponds, and cultivated by Mr. Gildersleve, produces the Laurus culilaban, the bark of which is much sought after as a simple. The west end is remarkable for the great quantity of sea-side grape (Coccoloba uvifera). The sand-hills on the north side are overgrown with the Suriana maritima; other places are possessed by the Rhizophora mangle, Scævola lobelia; and a species of Croton, which, amongst the Virgin Islands, is peculiar to Anegada, seems to extend almost over the whole island. The juice that flows from its branches and leaves, when pressed, stains so badly that nothing can remove it; the smell is stronger than that of Croton balsamiferum.

The beautiful Robinia squamata is frequently met with, and its yellow clusters of flowers add not a little to the embellishment of the Anegada Flora. I have observed that the yellow colour prevails in a striking manner amongst the flowers of the island, the red and blue occurring only in a few instances.

There are likewise four or five plants of the Agave vivipara, two near the settlements, and three to the northward of Mr. Gildersleve's. In a short space of time a large quantity will be found on these spots, for even now colonies have formed themselves round the mother plants. The other Virgin Islands do not possess this plant, neither do I recollect of having seen it in Porto Rico.

The dispersion in tribes of these plants, which in a great measure are strangers to the other Virgin Islands, leaves no doubt that the seeds have been carried there by the currents, and, perhaps, also by birds, which arrive regularly from the Spanish main at two periods of the year.

The edges of the ponds are usually covered with red Ulvæ, which leave a like colour when pressed between the fingers, and when taken out of the water and exposed to the sun become decomposed and smell most offensively. I discovered a similar Ulva on the coral rocks when the tide had retired.

Though the class Lithophytæ predominates, still Anegada is indebted for its origin to the united and indefatigable labour of the following tribes: the Madrepora muricata, galaxea, astroites, and porites, Millepora, alicornis, compressa, Nullipora, &c. Captains Flinders and B. Hall, as well as M. Quoy, have so fully described the economy of these animals, that I consider it entirely superfluous to say more respecting them*. Ceratophytæ are more

* I saw, on the south-eastern reef, a strange formation of their work;—it was somewhat in the shape of a kettle, regularly excavated, and at a foot distance,

on the southern side than the northern and eastern. Generally speaking, the different tribes of Polypi, Acalephæ, and Echinodermatæ, are numerous round Anegada.

Of all the insects the mosquito (a species of simulia or atractocera) are the most troublesome in the island; indeed the torments which they cause the inhabitants and the casual visitor are unceasing. They swarm not only during the day, but they are increased at night by the 'gallon nipper,' a species of a larger description than the common mosquito, and also more venomous. During the last twelve years Anegada had not been visited by so large a swarm of these insects as during the late summer of 1831; indeed, I was several times obliged to return from my surveying to the settlements, not being able to proceed in consequence of their painful stings. It is only possible by making continually smoke around the habitations to get rid of them in some measure*.

Of other venomous insects there are the Scolopendra morsitans, Scorpio americana, black and blue spiders, the bite of the latter of which is dangerous, causing sudden inflammation. It is curious that there are no black worms or gongolos (Julus fuscus) to be met with, though there are great numbers in the other Virgin Islands. Persons who brought some over from Spanish Town, out of curiosity, told me they died in a short time without propagating. It is certainly a remarkable fact, that as the distance between Virgin Gorda and Anegada is so trifling, and the Julus fuscus in such large quantities on the first island, that there should be none in the latter. Can the air be the reason of it, or the exhalation of the ground peculiar to Anegada? If the latter be the reason, it must be attributed to the calcareous nature of the soil.

The species of Crustacea are numerous, and afford a considerable addition to the sustenance of the inhabitants. The number of Astaisis, Scyllarius, and Cancer, which may be caught in the reefs, and, during night, on the rocky shores on the north side, is considerable. One would suppose that the Mollusca were likewise numerous, and that a conchologist would be amply rewarded by an excursion thither; but he would find himself deceived, the species are but few. The Tellina radiata is found in the greatest perfection; likewise Pholas and Mya, some Cypreæ, and sometimes

surrounded by a wall of like height. The diameter of the whole work I estimated to be about 11 or 12 feet. Though I sent a diver below to break off a piece, he could not succeed.

* They had mostly disappeared since 1819, without any reason being alleged for it; but returned in 1831, in larger swarms than ever. These insects are not only a scourge to man, but the poor beasts suffer likewise; and I have been told, by different persons, that they have known the wild goats return to the settlements in order to seek protection. The sheep suffer the most from their bites, which cause inflammation, cramps, and even death amongst them.

a pretty specimen of the queen conch (Buccinum flammeum). During the month of May, when the tide is the lowest, and the water retires from the reefs, the olive (volutæ spec.) is forced, by the heat of the sun, to leave its place and crawl towards the water; a considerable quantity are taken during that time, but common and of no value.

The surrounding sea abounds in good fish, to which the ponds add likewise their number; without entering into details, I mention only one fact which deserves a strict investigation. It is well known that the yellow-billed sprat (Clupea, or Thrissa), baraicua (Perca, Browne), the bottle-nosed Cavalla (Scomber, Browne), rock-fish (Perca marina, Catesby), and sometimes the king fish (Xiphias), are occasionally poisonous, and are known to have caused immediate death. To what the poisonous quality of these fishes is to be attributed is very uncertain; it has been supposed that their feeding on copper-banks, of which there are some at St. Eustatia, renders them poisonous; others deny this, and attribute it to their feeding on narcotic submarine plants. However, though frequently accidents happen in the neighbouring islands, not one instance of fish poison has been known in Anegada; and the yellow-billed sprat, the largest baracuta, and even the amber fish, are eaten with impunity. Who can solve this enigma? If we suppose that the feeding on copper-banks renders certain fishes poisonous, then the waters round Anegada must possess a powerful antidote, of which the neighbouring islands are deprived; or if the poisonous quality arise from the feeding on a narcotic submarine plant, then Anegada must not only be without it, but the dangerous quality of that plant must be instantaneous, and the fish must have been caught immediately after having fed upon it, because the distance between Anegada and Virgin Gorda being so trifling, one would suppose (even admitting that the seas near the first island are divested of it) that there would be, at least, one instance where the poisonous fish directed its course towards Anegada, and being caught there, proved injurious to those who ate of it. Mussels and crabs are likewise innocent. As there is almost no doubt left that these animals are rendered poisonous by living near manchineel trees (hippomane mancinella), and feeding upon their roots,—and as Anegada possesses not a single tree of that kind,—shall we therefore conclude, that not only mussels and crabs, but also the fishes mentioned before, are rendered poisonous by the roots of manchineel, which are known to grow on the waters' edge, and to send their roots to the same? I acknowledge myself negligent in not having investigated this point before, but I hope yet to add some further observations to the little knowledge we have of it. It is a blessing conferred alone on the inhabitants of Anegada, that they can enjoy any fish without being afraid.

Of reptiles we find the snakes common to the Virgin Islands. I have met with a small red snake, very similar in appearance to the dangerous coral snake; but I was assured that this species was entirely inoffensive. I saw likewise the Amphisbæna fuliginosa, which was a stranger to the inhabitants, and must have emigrated from the Spanish main. The leguan, or guana, (Iguana sapidissima) is frequently met with at the west end, and attains a considerable size: it is hunted with dogs. The gally wasp, or woodslave (a species of lacerta), is seldom met with. The green turtle (Chelonia mydas) deposits frequently its eggs in the sandy bays. Previous to 1819, quantities of the Chelonia imbricata were caught on the shallow ground round Anegada; but it appears that the dreadful hurricane which took place that year must have driven them away and destroyed their progeny; it is now very rarely that one of them is met with.

The feathered tribe is very numerous, as may be supposed, the island possessing so many and so extensive ponds. Amongst all the strangers which pay occasional visits to Anegada, the flamingo (Phœnicopterus ruber) distinguishes itself. They arrive usually during the rainy season, when the Oronoco inundates its shores, and deprives them of the means of procuring themselves food. With the first southerly wind, at that period, they approach in flocks of hundreds, and choose Flamingo Pond for their favourite abode; whence they proceed every morning at sunrise to the reefs, where they feed till the sun draws near the horizon, when they return. It is a splendid sight to see several hundred drawn up in a regular form, resembling the figure of a cross, approaching from the west, flapping their mighty wings, and the sun reflecting his rays upon their rose-coloured breasts, the air resounding with their cry, which, consisting of several cadences, has been compared by the inhabitants to singing. It appears they decrease annually; they even do not breed in Anegada, as they did formerly. On the Spanish main these birds are held sacred, and are in no way molested by the superstitious inhabitants. Unfortunately their flesh is palatable, and the Anegadians, not influenced by religious awe, commit annually great destruction amongst them.

The ponds are further frequented by large flocks of ducks, Hæmatopus, Ardea, (virescens and cœrulea,) Charadrius, Calidris, Dicholophus, Psophia, Parra, Fulica, and others of the Grallatores, which, on the approach of man, rise over the surface of the ponds and fill the air with their deafening cry.

With the exception of domestic animals, Anegada has but one species of mammalia in abundance, and that is the rat. They are really a scourge, and march during night in great numbers over beds, chairs, and tables. They intrude even during day, the shelf-holes affording them a certain retreat in case of emergency.

The population of Anegada consists, at present, of eleven white, and twenty-one coloured and black families.

Current.—It is well known that the tropical current caused by the earth's rotation sets to the westward, and its grand movement in these latitudes is directed through the Caribbean Sea; but it is probable that a branch of it, turned aside by the north-eastern coast of South America, sweeps along the Caribbean Islands to the north-west, till it reaches the Bahamas, where it is diverted by the Gulf-stream through the channel of Bahama; and it is this branch which at present attracts my particular attention, and in proof of the existence of which I adduce the following remarks:—

Vessels bound from America to the West Indies, and chiefly to St. Thomas's, find themselves frequently to the north of the Virgin Islands; and this deviation from their intended course has proved but too often fatal, having brought them on the reefs of Anegada when they thought themselves far to the southward of that dangerous island. Nor can repeated occurrences like these be attributed exclusively to errors in the observations for determining the latitude, or to false reckoning.

I left New York the 28th of October, 1829, in the American brig, William and Thomas, bound for St. Thomas's. We made Bermuda the 7th day after our departure, when contrary winds retarding our course, we discovered land in the morning of the 15th November. The captain, according to his reckoning, pronounced it to be St. Martin's, but fortunately observed, on approaching, that it was Virgin Gorda, or very probably the same night would have seen us on the reefs of Anegada.

I conversed with Captain Brown of the English brig Francis, bound from Nassau (New Providence) to Trinidad, who having been prevented by cloudy weather from taking an observation for several days, according to his reckoning was far distant from Anegada, and, making land in the evening, considered it to be St. Martin's, but was wrecked on the reefs of Anegada at eleven o'clock the same evening.

The American brig Lewis, Captain Turly, bound from Philadelphia to St. Thomas's and Maraiaibo, was wrecked on the south-eastern reef of Anegada, 9th April, 1831. According to his reckoning he was the day previous on a parallel with St. Thomas's; and I have been told that a second time he narrowly escaped being wrecked on nearly the same spot where he had thus lost the Lewis, having discovered the foam of the breakers just in time to bear away.

During my survey of the island and reefs of Anegada, I had additional proofs of the existence of this north-westerly current. I found on the south-eastern reef several buoys with Tyer ropes attached to them, which, as Anegada does not possess the Tyer*,

* Corypha.

and they could not have drifted hither from the islands to the westward, I believe came from St. Martin's. I found also, some days after a severe gale (the 24th September, 1831), two buoys on the same reef, which appeared to have been attached to anchors. When sounding between Virgin Gorda and Anegada, I threw the log every thirty minutes, and kept a regular account of what ought to have been our position between sounding and sounding; but I did not neglect to take likewise the bearings of some remarkable objects determined before, and it was very seldom that both methods agreed, our drift being always westerly; nor could I attribute this to the influence of the tides, the result being the same whether these set north or south. To obtain further proof, I also left my anchorage one day, and sailed ten miles to the northward of Anegada, where the boat was lowered, and rendered stationary, by means of a kettle filled with stones, it being then southern tide; in spite of which, the log was carried north-west by west. I repeated the same experiment in the waters between Virgin Gorda and Anegada, where I had the advantage of anchoring; and the set was always the same, the drift being nearly one knot.

I have already noticed the calcareous and siliceous deposit on the southern side of Anegada, which I consider to be the drift-matter of this current, and very likely a part of the sediment brought down by the Oronoco. This explains the reason why there are many plants to be met with on the island, which do not exist in any of the other Virgin islands, but are peculiar to South America; and as they are preserved on the southern shore of Anegada, where the surf is not so impetuous, the flora of this side is materially different from that on the other.

I saw, on the north side of Anegada, a great quantity of cork shavings; and, on inquiry, was told by the inhabitants that such had been drifted ashore annually for many years, in sufficient quantity to supply them abundantly with cork to attach to their fishing-nets. Now, the cork tree * being indigenous in the south of Europe and in Africa, I conjecture that this drift is first brought from the coast of Spain and Portugal, and swept along with the south-east current which prevails there, till it meets the grand westerly current, through which it is carried by the branch which takes this north-western direction, to the low shores of Anegada; and it would be desirable to ascertain whether like pieces of cork are drifted on other shores of the Caribbean Islands.

There is also a remarkable current inside the reefs of Anegada, which sets along the shore from west to east, on the north side, and from east to west on the south side of the island, till it completes the round, when it is discharged through a channel near the west end.

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* Quercus suber.

On examining the list of vessels wrecked on Anegada, it will be observed that the Americans are the greatest sufferers; the next in number are those from Spain; with few English, and still fewer of other nations. And it is certainly true, that the Americans trade the most with St. Thomas's. But besides this, their vessels, after having crossed the Gulf-stream, are likewise most exposed to the influence of the north-west current; and next to them are vessels from Spain, bound for Cuba, which may have taken advantage of the western tropical current. I can only conjecture the extent of the current outside of Anegada, but it seems probable that it does not reach farther than 24° north latitude, where I conceive it may be diverted by the branch of the Gulf-stream, which escapes laterally through the Bahama channel, or by others of the many local currents existing near those islands; though this can only be determined by a strict examination. Being a branch of the grand current into the Gulf of Mexico, it is very likely that its temperature will be found to differ from that of the rest of the ocean, and essential advantage might be thus derived, in approaching these latitudes, from the use of the thermometer.

The north-western tide between these islands is much stronger than the flood-tide of the south-east; undoubtedly from the circumstance that tide and current work the same way. And there are two other facts worthy of note. 1. The greatest number of wrecks on Anegada occur in the months from March to June. 2. Vessels of large burden strike usually on the reefs to the south-east, while smaller ones generally go on shore farther west. I have formed the following opinion regarding both points. The wind blows frequently, from March to June, from the S. and S.E., and the velocity of the north-west current will be thus increased; in consequence of which vessels bound, during that time, for these islands are more subject to error in their course than at any other period. And lighter bodies being more influenced by currents than heavier ones, I conclude this to be the specific cause of the second remark.

A further investigation of the facts stated above appears to me, however, to be of the greatest importance; and it would be very desirable that the attention of commanders of vessels bound for these islands should be called to the subject. The publication of their remarks might, in some measure, prevent the distressing scenes of which, unfortunately, Anegada is but too often the theatre.

The following list of vessels, lost on Anegada within the memory of man, is incomplete and deficient in details, being drawn up merely from oral testimony; but its extent sufficiently

proves the dangerous position of these reefs. References are made in it to the points near which each vessel was lost, as shown on the accompanying map.

A . 1 Rufus, American schooner.
B . 2 Collector, ditto, 1831.
3 James Edwards, ditto.
4 Maxwell, ditto.
C . 5 Arcadia, American brig, 1823.
6 Volvent, Danish ditto, 1819.
7 Tartar, American schooner.
D . 8 Francis, English brig, 1831.
9 Task, American brig.
E . . 10 Ajax, English ship, Sept. 1819, captain and thee men drowned.
F . . 11 Renominée, American brig.
G . . 12 Mason's Daughter, American schooner.
H . 13 Nelie, American ship.
14 Surinam, American schooner.
I . . 15 Paterson, June 1818.
16 Calabash.
17 Rosenleau, French privateer.
18 Astrea, British frigate, May 1808. Four men lost.
19 Union, American Schooner.
20 Donna della Gracia, Spanish brig, 1831.
21 Esperanza, ditto.
22 Ocean, English ship.
23 Charles, English brig.
K . 24 Chillingham Castle.
25 Restauradora, Spanish schooner, with slaves, many perished, 1831.
26 Lewis, American brig, 1831.
27 Donna Paula, with slaves, 1819.
L. 28 Corsica, American brig, 1831.
29 London, English ship.
30 L'Aimable Lalalou, French ship.
31 Columbus, American schooner.
32 Mary, American brig.
33 Spanish felucca, 1808. Three men lost.
34 Bulwark, American brig.
35 Sarah.
36 Halifax Lady.
M . 37 Otto, Danish ship.
38 Argus, English brig, 1819.
39 Spanish ship, 1810.
N . . 40 Byron, English schooner.
O . 41 Spanish felucca.
42 Caroline, American brig, 1822.

P. { 43 Marquise de Vienne.
44 Schooner, supposed from Trinidad, all hands perished.
45 Il Candeliero.
46 Sophia, schooner. }
Q ..47 French brig.
R ..48 Good Hope.
S ..49 Martha, schooner.
T . { 50 Sexta, schooner.
51 Fleur de la Mer, under Portuguese colours. }
U ..52 Spanish felucca, 1822.
V ..53 Lioness, American brig, 1811.

ANALYSES,

&c.

I.—*Journal of a Voyage on the Bahr-Abiad or White Nile, with some general Notes on that River, and some Remarks on the District of Atbara, made in a Tour from Hartoum.* Translated and partially abridged from a Report addressed by M. Adolphe Linant to W. M. Leake, Esq., Secretary of the Association for Promoting the Discovery of the Interior Parts of Africa.

1. *Voyage on the Bahr-Abiad.*

M. LINANT commences his narrative thus:—

'I remained several days at the junction of the Bahr-Abiad with the Blue river, in order to determine the position. By the mean of my astronomical observations, a small island, placed just at the fork, is in 15° 34′ north latitude, and 32° 30′ 58″ east longitude from Greenwich. I then was obliged to wait a little longer for a fair wind to carry me up against the stream, the weather being quite calm till the 5th of April, 1827; when, at sunrise, although still calm, the clouds began to rise from the north, and about ten o'clock a strong gale arose, with rain. We immediately weighed anchor and proceeded; but unluckily the dust, raised by the wind, completely obscured the banks of the river on both sides.

'We ascended the river at a great rate, the current being very slight against us; and the waves rose astern as in a wide sea. I sounded occasionally, and found always from three to four fathoms. The river, in many places, was a mile and half wide, and even then was far within its regular banks, which sometimes seemed above four miles distant one from another, and were distinctly marked beyond a wide sandy beach without any appearance of verdure; but even this is not the full width at the greatest height, as the river then overflows the adjoining country to a considerable extent, especially to the west, the eastern bank being the higher, although on both sides the general aspect is flat. The farther banks are covered with wood, on the eastern side, of stunted growth, rooted chiefly in sand; on the western, of larger size, and growing in a better soil. On the borders of the river were an almost innumerable quantity of wild geese, pelicans, swans, &c.

'Proceeding with a fresh and fair wind, with little current against us, we made great progress; and, about one in the afternoon, passed a mountain named Aoulle, on the eastern bank, situated close to the river, and covered with trees and herbage. Its basis is red granite, but not of very good quality, and extending in a direction from S.E. to N.: some portion of its prolongation can be traced both in the bed of the river, and, beyond it, in the northern quarter.

'Shortly after leaving Aoulle, we were enabled to render some little service to the inhabitants; for, passing a place called Merkerdar, where some Arabs were encamped, we saw one of their boats sink in the middle of the stream; and although the men seemed to swim well, and the women with their children made an attempt to do the same, yet a crowd gathered instantly on the adjoining bank, and much interest and alarm were excited. I immediately shortened sail and sent my little boat to assist, by which means the whole were brought ashore, and even the cattle and furniture were, for the most part, saved. Luckily, during the whole confusion not a single crocodile appeared: in general they are very ravenous.

'Wherever we passed, during the whole day, the country appeared more densely peopled, and there seemed to be a greater abundance of horses and cattle than below the junction of the river; but we did not observe a single permanent village, except in one place where there were some straw huts, and where the inhabitants, when we passed, were busily engaged in fishing. The men, two and two, holding a small net, enclosed a space between them as with a seine, and, drawing it on shore, brought in a few fish, a much greater number probably escaping between each little net. The women, children, and aged, stood on the banks, and collected the fish as brought on shore.

'About half past five o'clock we stopped for the night at a place where some Arabs were encamped, opposite a mountain called Guebel Tinné, so named because at its foot there is a wide extent of country periodically covered by the inundations of the river, but which, on its retreat, is of great fertility, and is thus regularly cultivated. This mountain is on the western bank of the river, and about seven miles distant from it. We found the Arabs to be of the tribe of Husseinades; their camp was agreeably placed under some fine trees, separated from the river by a hillock of sand, covered with bushes, and their huts were made of straw and woollen stuff. Their Sheikh, whose name was Moussa, was not with them, but his son did the honours in his stead, and came to see me, with many of his comrades, bringing a sheep as a present. He was a remarkably fine-looking man, as were, indeed, the whole party with him; and all seemed well-disposed;

Fahrenheit's thermometer was this day 107° in the afternoon, 90° at night.

'*April* 6.—We passed the night very quietly, having made fast to the bank near the Arabs; and, in the morning, again made sail with the same wind as before. The cold at this time was sufficiently sharp. In general I thought that the eastern shore was somewhat lower, and the river narrower, here than before. Towards evening we observed a little island covered with high trees, and both banks were also richly wooded, with a fine verdure quite to the water's edge. To this point, accordingly, the Turkish government frequently sends to cut down wood for useful purposes, especially boat-building; and the view in passing is most beautiful.

'We arrived, towards evening, at Wed Shelayeh, where resides the Sheikh Mohammed Wed Shelayeh, who gives his name to this place, and is chief of the Hassanieh Arabs. I had a letter for him from the governor of the province, and sent accordingly in quest of him; but both he and the Caymacan (second in authority) were gone to a village at some distance to obtain payment of its contributions, and were not to return till the following day.

'*April* 7.—The Caymacan arrived this morning, and I sent immediately my cawas, (Turkish attendant,) to beg that he would press the return of the chief, whom I much wished to see, in hopes that he would send one of his people to guide me in my further progress, if, indeed, he did not himself accompany me. In the meantime I crossed over to the other side of the river to shoot, and found the whole country covered with fine trees and plants, and abounding in monkeys, birds of various kinds, and antelopes.

'In the afternoon, seeing my cawas on the opposite bank of the river, and the Caymacan with him, I re-crossed, and learnt that the Sheikh would certainly arrive that night. The Caymacan supposed that the Sangiac (Turkish governor) of Hartoum was arrived, having received that report from a man who had mistaken my boat, followed as it was by two others coming to load wood, for that of the governor. The Caymacan, nevertheless, was very civil, and sent me several sheep.

'*April* 8.—In the morning Sheikh Mohammed Wed Shelayeh arrived, also expecting to see the Sangiac; I sent him immediately the letter which I had brought for him. It gave him great uneasiness, as it ordered him to accompany me as far as the country of the Shilouks, with whom he was at the very moment at war. It is true that, being occupied in levying contributions for the government, he thought he might, on this plea, dispense with going himself; but there was almost equal difficulty in determining whom he should send in his stead. He visited me,

when I found him a mere savage, without manner, and saying little, except to complain that I should think of going among the Shiloukhs without an army, assuring me that I should be murdered by them, with all my attendants;—to which one of his suite added, that news had been just received that the Shiloukhs were even preparing to descend the river and attack the tribe of Hassanieh. I replied, that this news was certainly false,—that the very same story had been told to another officer lately arrived at Wed Shelayeh;—that I saw the object was to induce the whites to leave the country altogether; but that I was determined to proceed, at least, to Sheikh Nimmer, who held the frontier between Hassanieh and the Shiloukhs, whence I should send a messenger forward to announce my arrival to the king of the Shiloukhs, and to obtain a safe-conduct from him; I should thus only want a relation of Sheikh Mohammed's to accompany me as far as to Sheikh Nimmer's encampment. They appeared much surprised at this reply, but readily assented, not at all suspecting my real intention, which was to proceed, if possible, at all risks; and I am persuaded that without this deception I should not have procured a guide here at all.

'Indeed I was in some doubt even myself what to do, and sometimes thought of merely acting as I said; while, at other moments, I conceived that if I could meet with a fair wind from the north, it would be best to go right through the country of the Shiloukhs, to where their king resided,—in which way I might have little to fear, there being eleven persons in the boat, well armed; for I was told that the country of the Shiloukhs was only six days' sail in length, and that above them the natives were much less ferocious. But in adopting this course two things were to be apprehended: my men might revolt,—or I might meet with some part of the river too shallow to float my boat, in which case, with little or no current to assist me, and a contrary wind, it might be difficult to return. And it would be still more difficult to advance by land, in consequence of the enmity of the inhabitants: besides which it was important that I should *sail* past the country of the Shiloukhs, in order to be certain whether there was or was not a fork of the river about this point, which many circumstances led me to think probable. Ultimately I resolved to continue advancing, as I might be best able, by the river, obtaining information and maturing my projects as I proceeded.

'*April* 9.—In the morning I went to call on the Sheikh, who received me well, and gave my party plenty of merisa and bulbul * to drink, which they accepted willingly; but I was unable to extract any further information, the Sheikh being an absolute brute,

* [Liquors of different degrees of strength, fermented from a mixture of Doura bread and water.—See *Burckhardt's Nubia*, p. 218.]

and his people not less stupid and ignorant. I asked, also, if they had any Shiloukh slave among them who might serve me as an interpreter, and also, in some degree, a hostage for my safety, but could find none.

'*April* 10.—As they were all occupied with their contributions, and would talk of nothing else, I crossed the river to shoot in the woods, which there skirted the water. I tried to catch some monkeys in a way very common here, by intoxicating them; but they were too cunning, and only tasted the liquor set out for them by dipping the tips of their fingers in it. I was more successful with birds, and shot a considerable number, which I afterwards endeavoured to preserve; but the ants got to them, to my great regret, as many were very interesting.

'*April* 11.—I sent to tell the Sheikh that I should set off positively the next day, and that he must therefore send me one of his relations early to accompany me. I preferred approaching the Shiloukhs, at all hazards, to remaining at Wed Shelayeh, where I learned nothing new concerning them.

'*April* 12.—In the morning Sheikh Mohammed sent me one of his relations, as directed, avowedly only to accompany me to the last encampment of the Hassanieh, under Sheikh Nimmer. But I was determined to carry him farther if I saw occasion; and on the score of deception we were on equal terms, as he began, even in the very beginning, with telling me the grossest lies with the most unblushing assurance.

'The wind was fresh and fair, and we proceeded at a great rate. The river was not quite so wide as before, but the banks, which were covered with large trees, were somewhat higher, and the inundated country, consequently, was of less extent. In the course of the day, in approaching the shore, a hippopotamus, which was in the water, alarmed by the approach of the boat, landed and trotted away, opening and shutting his mouth. Having thus marched about one hundred and fifty paces, he returned to the river. About three in the afternoon we arrived at Mettatanna, where a passage-boat is kept for the use of the caravans between Sennâr, Wed Medinet, and Cordafan. A number of Gelabes were passing at the time, to whom I stopped to speak. They were of the tribe of Cubabish, actually in revolt against the Pasha, and were consequently so much afraid of us that, had not their merchandize been all unloaded and scattered about the beach, they would have fled. I learned from them that Sheikh Nimmer, who formerly had his camp considerably higher, was then at no great distance, a circumstance of which our guide immediately availed himself to assure us that the Shiloukhs had driven him from his former encampment. We were then on the eastern side of the river, and I was preparing to cross to look for

him when he arrived. He had seen our boat, and came over in a passage-boat to visit me, but first demanded the *Aman*, or assurance of safety, which I immediately granted. He is an old man, respectable in his appearance, but filthy, stinking, and disgusting on a near approach. I spoke to him of my proposed voyage, on which he made nearly the same representations as the people of Wed Shelayeh, but, nevertheless, almost agreed to accompany me. We re-crossed the river together, and he left us, promising to send us a sheep.

'I was undecided what to do, fearing that if I advanced too far without intimating my arrival to the Shiloukhs, and they took umbrage at this, I might find it almost impossible to return, my boat being heavy, the winds contrary, and the current almost none. The Cubabish, meanwhile, departed with their caravan; and shortly afterwards I saw one of my servants, on the bank of the river, speaking to a man of the country, tolerably well dressed, for he had a shirt (which is not very common), with good arms, and an ass well saddled. I called to my servant to ask who this was, and he answered that he was a faquir, or fanatic, of Sennâr, named Mohammed, who knew me well. This excited my curiosity, and I sent for him. He said that he had been several times among the Shiloukhs when going to Cordafan; and that, with little danger, I might go as far as Aleis, below which I should scarcely see any of that people. He added, that he was himself arranging his tribute with Nimmer; and as I thus became interested about him, I lent him the weight of my recommendation, and soon settled his composition.

'The Sheikh, however, when I spoke of setting off the very next day for Aleis, started many more difficulties than in the morning; and the relation of Sheikh Mohammed told me expressly that he would not accompany me. I threatened and encouraged them both by turns, but in vain; and in the evening I anchored in the middle of the river, the wind being at east, and consequently the boat being in complete safety. The hippopotami were in great numbers all round us, and apparently much enraged at seeing our boat, as were certainly all the Arabs in the neighbourhood, the Turkish boats never ascending above Wed Shelayeh.

'*April* 13.—In the morning I sent for Sheikh Nimmer, who did not, however, arrive till mid-day. I also kept Mohammed's relation on board under different pretexts, and the faquir of Sennâr, who had agreed the evening before to accompany me. When I had thus got them all on board in the middle of the stream, I asked Sheikh Nimmer if he would now go with me; on which he renewed his representations, enforced by Mohammed's relation. I then asked their last word, which being a refusal, I told them, that since this was the case, I would take them by

force, and immediately made sail. Nimmer now changed his tone, and said, that for going merely to Aleis there might not, probably, be much danger, provided the Shiloukhs were not previously informed of our voyage, and did not, in consequence, assemble a considerable force there to attack us. He also confessed another thing, which he had always before denied, viz. that he had often made incursions into the country of the Shiloukhs, and knew it well. His people, when they saw me depart, assembled on the bank of the river, and appeared uneasy; but he called to them not to be alarmed, for that he was quite well; and they then dispersed.

'At a little distance above Metta-tanna we saw the last Arabs of the tribe Hassanieh, at a place called Madennelkell. They were in great number, encamped on the bank of the river, under some very fine trees; and had also, on the western side, opposite their encampment, a portion of country under cultivation, bearing kidney-beans and doura. Sheikh Nimmer told me that we should not now meet with any one until we saw the Shiloukhs, excepting at another place, about a league higher, where the Hassanich have a salt work; and, perhaps, on the western bank some Cubbabish, coming to the river to water their flocks and renew their own stock, which they generally do every five days.

'We had but little wind the greater part of the day; but passed several islands covered with large trees of a splendid green. The country had changed very much its aspect. Nature was without ornament, but, as it were, more majestic in the absence of man; the river was wider, and its banks were covered with larger trees, which were no longer obstructed with brush-wood, but stood in groves, amidst a rich herbage of the finest hue, as in an English park. Towards evening we saw numerous herds of antelopes and wild cattle come to the river to drink; quantities of rare birds were seen on all sides, and the water swarmed with crocodiles and hippopotami. At night we were obliged to stop abreast the island of Shebeshi, which is covered with wood, but anchored in the middle of the stream for safety, and to pass the night in repose.

'I had now arranged the following plan in my own mind. I thought if the wind favoured me ever so little that I should reach some place where I would find Shiloukhs, before the news of my arrival could reach them; for by proceeding during the night I could easily gain such a point the following evening; whereas, according to our calculation, the intelligence by land could not arrive before the night after. I might thus surprise some Shiloukhs, either on one of the islands, where they frequently gather honey and chase hippopotami; or at Aleis itself, where they have a permanent encampment. I could then give their boat to the three men I had with me, with which they might return if

they did not choose to accompany me farther; while under the guidance of the Shiloukhs themselves, I should proceed as rapidly as possible to where their king resides, which is six days' journey above the frontiers, at a place called Damab. In placing myself under his protection I knew well that I should run little or no risk, as far as my life was concerned, for they respect more, perhaps, than their neighbours the laws of hospitality, excepting only near the frontiers, where they are all great robbers, and where, besides, I had to fear that they might take me for a Turk intending to levy a contribution on them, and might thus persist in attacking me, in spite of every representation. I told no one in the boat my project, excepting only my Turkish soldier, who was much alarmed, but did not venture to disclose it.

'During the night a little wind having risen, we set sail, and proceeded a little farther; but it soon again fell calm and obliged us to anchor.

'*April* 14.—At day-break we had again a little breeze, and got as far as the island of Obeiha. The wind then suddenly turned to south, and blew with considerable force, which the more discouraged me, as I saw that it would continue to last that day and night. We landed on the island in search of honey, and to shoot a few birds, and found it covered with fine trees, long and straight, without underwood, with the intervening surface thickly set with herbaceous plants, and strewed with the feathers of birds, which were in the trees by thousands—among them were many small green parrots. We easily found two hives in the trunks of the trees, but the bees being still in them, we could not take the honey. It is this honey and the chase of hippopotami which alone bring the Shiloukhs to this desert part of the river, which is above two days' journey in length.

'In the afternoon, the wind having abated, but still hanging to the south, I weighed, and endeavoured to proceed with the oars, but the boat was so heavy that it was with difficulty we reached the island of Douhem against both wind and current; we there anchored again in the middle of the stream, for greater security. About two hours after dark, heavy clouds, with lightning, appeared to the southward, and we prepared for a tempest, which, in fact, reached us about midnight; but, though the wind was high, there was luckily no rain. All night long we heard a roaring to the west, which I supposed to be that of lions, and the howling of hyenas to the east.

'*April* 15.—We set off early in the morning, the wind still light and variable. We thus saw the whole length of the island of Douhem, which is considerable, and which, as well as both banks of the river, are covered with high trees. Sheikh Nimmer assured me that he saw two men on the island among the trees, but I could

not perceive them even with my glass; nevertheless, as it was of great importance to ascertain the fact, I landed with four men well armed, but still was unable to find any traces of them. The wind now sprung up strong from the north, on which we made sail, and about mid-day arrived at the island of Hassanieh, which is large, and covered with wood. It was there that Sheikh Nimmer had made me hope certainly to find Shiloukhs, but we saw neither men nor their boats, the absence of which last was a certain sign that the others were also away, as these natives never stir without their boats. We did discover, however, some remains of fires which appeared recent; and, continuing our journey, but with less wind, arrived in the evening at the north point of the island of Merhada. I regretted exceedingly not having had a better wind, as now there was scarcely a doubt that the Shiloukhs knew of our approach, and we therefore kept a stout watch through the night, which was calm. Shortly after dark, while casting our eyes in every direction, and listening to the sounds of the hippopotami and lions, I saw a light, as it appeared to me, on the island; and showing it to Sheikh Nimmer, who assured me that it was certainly a party of the Shiloukhs, I proposed to him to start before day, in order to catch them. The Sheikh, on the contrary, said that it would be much better to return at once, as probably it was a strong party come down to oppose us; upon which one of my sailors remarked, that it was well proposed, as the crew would not proceed farther. I had been in expectation of such an event, and was prepared to act accordingly. I represented to the boatman that I had not taken the crew by force—that they had long known that I was going among the Shiloukhs—that they ought, therefore, to have spoken sooner, and that now it was no longer time. Then, rushing to my cabin, I seized a pistol, and placing it in my girdle, I threatened to shoot the first man I should hear disputing my orders instead of obeying them. The Reis and the other sailors on this awoke, blamed the men who had occasioned the disturbance, and swore to follow wherever I chose to lead; on which I revealed my project, and, although much alarmed, they offered no opposition. The Sheikh Nimmer and the relation of Sheikh Mohammed were especially embarrassed, because, having no boat, they could not return by water, and were afraid to venture by land. As to the Fakir Mohammed, he was determined to accompany me. I wished to set off immediately, but the want of wind prevented me. The fires of the Shiloukhs continued burning till daylight.

April 16.—A little before daylight a slight air sprung up in our favour, and we immediately made sail; but there was not enough to carry us to the place where the fires had been burning till broad daylight, and then, to my great dissatisfaction, I saw the

Shiloukhs already embarked, and making off as fast as they could. With a little more wind we might soon have caught them; but, as it was, we traversed nearly the whole length of the island of Merhada before, on doubling a little cape, we found ourselves tolerably near their boats, in each of which were three persons. These, as we approached, leapt out of their boats into the water, armed as they were, with lance and sabre, and swam to the eastern shore. I did all I could by signs to engage them to remain, and open an intercourse with us, but they only halted a moment on the beach, as if to look at us, and, the instant we approached, retired into the woods uttering loud cries. I then examined their boats, in which they had left nothing except a skin filled with honey in the comb, which I had a great mind to keep; but, on reflection, I left it; and putting in each boat a mat, a piece of coarse linen cloth, and a little salt, all which things would, I knew, be agreeable to them, I hauled them up dry on the island, and left them.

'We then continued our route for Aleis; but, before making the end of the island, saw other two boats on the eastern bank, of which the crews had, in like manner, fled. About three o'clock in the afternoon we arrived at Aleis. There the river was narrower, the banks were less thickly wooded, and the timber was of a much inferior quality, being chiefly brushwood. Seeing a great many people assembled on the western shore, and being satisfied that they were not Shiloukhs, we approached them;—it was easy to see the difference, the Shiloukhs going always naked, while these were clothed. They were in no degree alarmed at our approach; but, on the contrary, came to meet us. I anchored in the middle of the stream, and sent my little boat to communicate with them, and invite their chief to visit me, which he agreed to do immediately. He was an old man, named Idris, clean, and of good mien; after having saluted us, and taken coffee, he told me that he and his party were Gelabes of Dar Sille, that they came from Darfur, and were proceeding, in the course of their trade, to Sennâr. They had arrived on the banks of the river the evening before, and a party of Shiloukhs were actually engaged in ferrying them across when the news arrived that an expedition of Turks was coming to attack them. The Shiloukhs had then retired, and were assembling in force at an island higher up, called Helle-tell-Kedawieh, having sent for reinforcements to another island called Aba. The old man added, that he and his people were in great alarm, seeing that they could not depart without their companions who were on the eastern side of the river, and that, only a few days before, sixty persons had been assassinated at a place on the western side, which he pointed to, and where I afterwards saw many skeletons. The report of this massacre had already reached me at Wed

Shelayeh. The murdered men were Gelabes, going to Sennâr, and were about to cross the river in the boats of the Shiloukhs, who, pretending that they required some repairs, detained the caravan till they had assembled a sufficient force to attack it, and then slaughtered the whole party, excepting two men who succeeded in escaping on a dromedary.

'Sheikh Idris answered all our questions frankly. He said that any Turkish army that might come would be stoutly resisted; the Shiloukhs being powerful, and the approach to their fortresses by land being through woods so close that they were almost impenetrable; while, by water, it was almost impossible, as the river a few miles higher up, at Merhada, the second island of that name, above Aleis, is only knee deep, in consequence of its great width. These words were a great disappointment to me; but I told him that there was no question of an army, none was coming, and that I was only a traveller who sought to be at peace with all the world. "Ah, ha," he replied, "you are then the English 'cawague,' of whom we have heard from merchants who have seen you." To which having assented, I communicated to him my plan of pushing on to the residence of the king of the Shiloukhs, which greatly surprised him, although he allowed, that if I were once with the king I should be safe, and that if I had succeeded in catching a Shiloukh, according to my first idea, I might have traversed their country without much apprehension; but now that would be impossible; and he again assured me that my boat could not ascend above an island, beyond Aba, called, like that below Aleis, Merhada; and that the residence of the king was five days' journey higher up. As this man had no interest in deceiving me, and as the Fakir Mohammed and others had before said the same thing, I certainly was now discouraged; and while yet hesitating as to what I should do, the wind fell, and it became quite calm. I calculated that all the Shiloukhs within two days' journey would be assembled the next day, and the day following would probably be at Aleis, irritated by the alarm to which they had been subjected, and willing to revenge it;—that having no one with me of their nation, nor even one who spoke their language, they would certainly take me for a Turk, and not spare me; and that, though we were enough to resist a small force, we could do nothing against an army. I determined, therefore, to return for the present, and to endeavour elsewhere to find a messenger to the king of the Shiloukhs, who might explain my objects, and obtain for me his protection. When I communicated this resolution to my people, they were delighted; and, by accident, the wind shifted to the south at the very moment.

'The old chief of the Gelabes approved much of my resolution,

and told me he had thought me mad when I proposed going direct to the king of the Shiloukhs; not considering that I did not know the country as he did, but wandered in the dark, with only such vague and contradictory notions as I was able to pick up among the Turks, who had even assured me, before I set out, that the river became both wider and deeper as it was ascended. He then intreated me to bring back his people who were on the other side of the river, where six of them were hid among the brushwood, with four camels; to which, as I was in some degree the occasion of their delay, I agreed. We went across therefore together, when he called to his people, and sent them to bring down their goods; as to me, I ascended one of several little heights covered with arbutus trees, which bordered the stream, and saw, at a little distance, the town of Aleis, which appeared to me of considerable size, and built like Sennâr, but chiefly in ruins, having been long since abandoned, except by some families who continue to reside here on account of the caravans which occasionally pass. I could easily have gone thither, but did not expect to find anything worth the trouble, as its few inhabitants were undoubtedly now fled; besides which, sunset approached, and I was anxious to profit by the fair wind for descending the river, as well as to increase our distance from the Shiloukhs, who when they knew that we had but one boat, might endeavour to overtake and attack us. Having landed the Gelabes and their chief on the western side, we departed, loaded with their benedictions; and, as I had foreseen that when the wind turned to south we should have a storm, we prepared to receive it. About eight o'clock, it struck us with such fury, that although we took in all sail we still went too fast, and in a moment afterwards the wind shifted to north, with rain. We then anchored, as it happened, precisely where we had hauled up the Shiloukh boats on the island the morning before; and all night long it blew strong, sometimes from one side, sometimes from another—towards morning setting in steadily from the north, and blowing strong.

'*April* 17*th*.—We set off in the morning, and tracked down against the contrary wind. In passing the boats which we had left on the island, we observed that one was gone, and that the several articles which I had put on board of them were also taken away; from which I conjectured that the day before some Shiloukhs had been left on the island, but that now they too were departed. In proceeding down the river we observed that the bank on the eastern side was of a firm sandy earth, and the water near it deeper than on the other shore. In spite of all our efforts we could not reach the island Hassânieh that evening, but were obliged to anchor in the middle of the stream. Through the night we kept a good watch, and heard a great many lions, but only to the west. In

the water there were great numbers of hippopotami. About midnight it fell calm, and we immediately departed, using the oars.

'*April* 18*th*.—By day-break we were almost at the north point of Hassanieh, where, the wind rising to a gale, we were again forced to track the boat down, and I profited by the opportunity to go shooting. I saw numbers of antelopes and wild cattle; among the trees were many varieties of birds, chiefly green parrots; the trees themselves were mimosas of different kinds, and the brushwood consisted, for the most part, of *nibok*, and of the sensitive mimosa with rose-coloured flowers, which produced a delightful effect, the plants being numerous and the flowers expanded. The banks of the river were also covered with a beautiful green turf, quite to the water's edge.

'In the afternoon we again set off; and although the wind was still contrary, and rather high, we arrived in the evening at the island of Douhem, where we remained till three o'clock the following morning.

'*April* 19*th*.—Setting off at this time we soon reached the island Obeiha; but the wind then blew so strong that we were again obliged to halt some hours. As the day advanced it abated, and, at last, fell nearly calm, which enabled us to proceed rapidly with the oars. The thermometer rose in an hour from 75° to 101°, and the heat was very disagreeable, the air being heavy and oppressive. In the evening we stopped at the island Shebeshi, excessively fatigued; but no longer fearing the Shiloukhs, I occupied the time till midnight with the chace and collecting shells, of which there were many different sorts along the beach.

'*April* 20*th*.—We set off early, and tracked down, the wind being again strong and contrary. We arrived before the *asser** at Madennelkell, and halted there: the natives, being Arabs, submit to Sheikh Nimmer, but they are stupid, brutal, very slightly obedient to the Turkish government, and have only a few superstitious notions of the Mahomedan religion. The Sheikh told me that he would get me some honey, and shortly afterwards sent a sheep; but, to my great surprise, a few minutes afterwards a man came and asked to be paid for it. I demanded of Nimmer what this meant; and reproaching him bitterly for his incivility, and the little hospitality which I had found among all the Hassanieh Arabs, I sent back the sheep. But the Sheikh of the village, the inhabitants, and the faquir Mohammed, urged me so strongly, that at length I agreed to accept it; after which, at night, they gave us a great feast, in order to relieve themselves from the bad impression caused by the Sheikh's conduct. Their encampment was very

* [Time of the afternoon prayer.]

beautiful, under high trees, close to the river; and immense multitudes of birds, and monkeys who seemed to have taken possession of the huts as well as of the trees, enlivened the scene.

'*April* 21.—Still tracking down against a contrary wind, we arrived, about mid-day, at Metta-tanna, where I was most happy to land Sheikh Nimmer, who had so infected the boat with his disgusting filth, that I passed the afternoon in having it washed out with sand and water. I offered him, on parting, a complete dress, according to the fashion of the country; but, although his own was absolutely in rags, he made no scruple in asking me for the value of my intended present in money. I did not stop longer at Metta-tanna, because Nimmer's people were mostly absent at Tourah, an inland lake, formed during the inundation of the river, and where sufficient water is collected to support the flocks for a considerable time without bringing them down to the river. I was certain that I could thus learn nothing by remaining, and that, in particular, I should find no one here willing to go among the Shiloukhs.

'*April* 22.—We set off early; and, as the wind was now N.E., and the current ran steadily to the N.N.W., we made considerable progress under sail, without much tracking. We arrived, in the evening, at the Island of Manieh, near Wed Shelayeh.

'*April* 23.—About eight o'clock we arrived at Wed Shelayeh, when I went instantly to the Sheikh to endeavour to find some one to carry a letter to the Shiloukhs. But I still got the same answer as before; no one would incur the risk of such a journey. I learnt, however, that Rustan Bey, governor of Cordafan, and lately come from Cairo, was expected at Wed Shelayeh in a few days; and believing him to be accompanied by a French officer, a M. Cadeau, who had letters for me, I determined to wait his arrival. Otherwise I should have gone, without delay, to Missalemieh, Obeid, or Sennâr, in order to send a messenger from thence to the Shiloukhs; hoping especially to succeed in this, through the means of Sheikh Ahmed Bedaoui, of Obeid, who is said to have frequent communication with the Shiloukhs.

'*April* 24.—Meantime I crossed over to the eastern bank to look for a curious plant, called *tartousse*, which I had before seen, and which a man here said that he could easily find for me. But whether it did not exist at this place, or was not at this time above ground, I know not; it was not, at least, to be found.

'Walking along the banks of the river, I saw on the sand the recent track of a very large crocodile; and thinking that possibly it might have been a female come ashore to lay her eggs, I followed up the track about twenty paces from the water-side, where the ground, appearing to have been much trodden, and recently disturbed, I dug, and found ninety-nine eggs. The

Arabs are in the habit of saying that ninety-nine is always the number of the crocodile's eggs; but I have found them of various numbers between sixty and ninety-nine. My people, and those of the place, immediately made a *fricassee*, which I tasted, but found very nauseous, having a flavour between rancid oil and musk. Each egg had considerably more white than yolk.

'Towards evening I re-crossed the river, and found Rustan Bey arriving, himself and his whole retinue mounted on dromedaries. As he alighted near my boat, I caused carpets and cushions to be spread for his accommodation, and invited him to visit me; but he would only take a cup of coffee, meaning to proceed instantly to Hartoum. He behaved with great frankness and condescension; talked to me on all sorts of subjects; and invited me to visit him at Cordafan after the rains, promising that I should have every facility to proceed thence wherever I pleased, and even, if I chose it, to accompany him into the Negro territory, where he proposed making some incursions. About sunset he departed, saying that he should only remain two days at Hartoum, and then return to Cordafan. He told me also that the Sheikh of the Cubabish had come to attack Sennâr, but was defeated;—all which gave me great pleasure. I was sorry, however, to find that M. Cadeau, who had my letters from Cairo, was not with the party.

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2. *Notes on the Bahr-Abiad.*

'The Bahr-Abiad is undoubtedly the principal of the two rivers which form, by their junction, the Nile of Egypt. It discharges a greater volume of water than the Bahr-Azrek; and, although somewhat narrower immediately at the confluence than it is higher up, it is, even in this respect, equal to the Blue River. The colour of its waters is also that which characterizes the conjunct stream in the dry season, the Bahr-Azrek being then of a greenish hue, while the Bahr-Abiad is always white, and, as it were, soapy, even during the inundations, when the Bahr-Azrek becomes reddish, from the nature of the *detritus* brought down by the Bahr-Toumat, which falls into it in the province of Fasuolo. And the Bahr-Mogren, or northernmost branch of the Nile, also brings down, at this time, a quantity of black earth which influences the general colour.

'The waters of the Bahr-Toumat are very considerable during the freshes; but at other times they are so low as not even to flow. And it is said that when it begins to rise it does so with such force and violence as to carry every thing before it, the noise of its approach being thus heard at a consider-

able distance, and taken as a signal to escape from its banks with the utmost precipitation.

"Below the junction the general aspect of the river has much more of the character of the Bahr-Azrek than of the Bahr-Abiad; in every respect resembling the former as to the nature of its banks and adjoining scenery, its width, sinuous course, sandbanks, and the want of large shells, such as are only to be found on the shores of the Bahr-Abiad. Below, also, as along the banks of the Bahr-Azrek, there are comparatively few aquatic birds, while near the Bahr-Abiad these are innumerable.

'I have been unable to obtain any precise information as to the origin of the Bahr-Abiad, none but the Arabs, called Corouns, and the Wed Abrof, pretending to know anything of it. Hassan, the Sheikh of Fasuolo, a well-informed man for his country, and who has travelled a great deal in the adjacent districts, gave me, however, some particulars, which induce me to believe that it cannot rise in a lower latitude than Fasuolo*. For the merchants who go directly west from that province into the country of the Negroes, and those who traverse the countries south of Darfur and Cordafan, along nearly the same road, and in the same parallel of latitude, as the Coroun Arabs, the Bagarras, the Wed Abrof, &c. all agree in saying that they pass no river west of Fasuolo, excepting the Toumat and some slight streams which are nearly dry in the summer season; and that during the same season they have no water in their encampments along the skirts of the Ethiopic chain, which extends east and west a great distance, excepting what they find in the beds of torrents or among the rocks. When I asked them, also, why they did not rather follow the banks of the Bahr-Abiad, they always answered me that it passed a long way north of them; and that, beyond the Shiloukhs, it came directly from the western quarter.

'It is certain that, in the country of the Shiloukhs, there are other rivers which come from the west; and the following is a list of them in the order in which they are met in ascending the stream:—1. The *Nid-el-Nil*, or feast of the Nile, which passes close under the mountain called Guebel Dahir, or "mountain of the round," so called because it is ascended spirally. (It is covered with Negro villages; is situated in the country of Tagalla; and the river, which passes to the south of it, is said to flow from a great lake to which I heard several names given, none of which I shall therefore cite; several other rivers are reported to fall into it, one

* [The journey of Ibrahim Kashef, mentioned in page 26, is adverse to this opinion; and not less so the result of the oral information obtained from Mehemet Bey, by M. Ruppel in Cordafan, the result of which is transferred from his map to the map accompanying the present paper.]

called the Bahr-Soudan)*; 2. the Suar; 3. the Hor el Karna; 4. the Serat; 5. the Hor el Nahal, besides some others.

'The Sheikh Hassan of Fasuolo also told me that south of the Shiloukhs the Bahr-Abiad is lost in some extensive lakes, which stretch away to the westward, and communicate with each other during the inundations, the intervening country being flat and marshy. And the remarks which I made on the stream agree well with this statement, neither gravel nor sand indicative of its being fed by torrents being found in it, and its shoals being all clay, proving that it does not come from mountains, but from a country of the same nature; or, at least, that if it does originate in mountains, it has a long subsequent course over a country of an opposite kind, whence its source cannot possibly be in the Mountains of the Moon, or, at least, in the place where they are marked in our maps. Besides all which, another remarkable fact seems to me to prove indubitably that it comes from a system of lakes; namely, the prodigious quantity of fish which arrive with the freshes at their first appearance, for these fish can only come from lakes where they remain imprisoned when the waters are low, and escape when the inundation takes place.

'At its junction with the Bahr-Azrek, as already observed, the Bahr-Abiad is not very wide, being not above eighteen hundred feet across; but, a little above, it enlarges much, its banks being frequently three and four miles apart, and in some places during the inundations, the waters extend twenty-one miles from side to side. It is said that they are specifically lighter and wholesomer for use than those of the Azrek; it is certain, at least, that the banks of the Abiad are much the more healthy.

'The shores of this river are very flat, especially on the western side; and the water is only deep towards the middle of the stream. On the western side the bank is composed of deposit from the river, without any sand; on the eastern it consists, on the contrary, entirely of a yellowish sand, not brought down by the river, but by the S.E. winds during the winter; and this, being stopped by the river, forms hillocks, which give this side a somewhat greater elevation, and the descent from it to the water a somewhat greater declivity than on the opposite shore. Hence, also, the water on this side is a little deeper.

'The rise of the Bahr-Abiad is not perceptible till some time after that of the Bahr-Azrek.

* [In a former journey of M. Linant, he was informed by some Takrouri pilgrims from Dar Sille, that they travelled two months on the Bahr-Abiad before they arrived at Sennâr; that, before arriving at the Abiad, they followed the course of another river upwards; and that the Abiad had its rise in a country called Bahr-el-Lesse, from which some of the waters flow towards Marok; viz. Marocco, or to the N.W.]

3. *Journey across the District of Atbara in a Tour from Hartoum.*

'*Hartoum, March 14th*, 1827.—I left Hartoum on the 6th of December last, by water, and arrived on the 10th at Abou Aras, on the mouth of the river *Rahat*. The two Sheikhs who accompanied me, (of whom one was of the tribe of Shukerieh, the other a Bishari,) having had occasion to stop at several villages on the way, did not arrive till two days afterwards, nor my camels till the day after them. From Abou Aras I went to visit some ruins five miles lower down, and not far from the river (the Bahr-Azrek): they are of considerable extent, and formed of burnt brick; I saw no stone among them, nor any proof that they were ancient. I visited also some other remains, near the mouth of the Rahat, which were more interesting, being composed of unhewn stone, although none such are to be found within even a considerable distance; and none of the modern inhabitants of the neighbourhood are likely to have taken the trouble to bring them here for the purpose. The Rahat was then nearly dry, and its bed is very narrow near the mouth.

'On the 16th of December we left Abou Aras, and, on the 10th of January, arrived at Shendy. We travelled quickly, being all mounted on dromedaries, and the Sheikhs in haste.

'Atbara is a very flat country, with mountains scattered here and there, like stones placed on a floor. For the most part the soil is thickly covered with trees and grass, or grass only; and in the endless plains which we traversed, it was frequently impossible to select a single object on which the eye could rest, except, perhaps, some distant mountains, which seemed islands in the midst of a yellow sea, the wind moving the herbage, far and near, like waves. In other places we found desert plains, in which there is nothing green; although, apparently, the soil is good, and capable of being sown after the rains, according to the usual culture of the Shukerieh Arabs who occupy the country.

'I expected to find some antiquities at Mandera, both on account of its name, and position on the direct road between Meroe and Axum, and from what I had heard; but, on the contrary, it is nothing but a small mountain of blocks of granite, like others which I have seen in Atbara, covered with grass and plants which grow between the stones. It is the principal resort of the Shukerieh Arabs during the rains, and until the month of December; but when I passed they were just gone down to the river Atbara, water having here become scarce. Large cisterns cut in the rock had been described to me as existing at Mandera, but I found only reservoirs distributed round the mountain, and

hollowed out of the earth, so as to retain water for some time; with two small natural basins, in which the water is confined by blocks of granite.

'From Mandera I visited Rera, the "fortunate place," as its name imports; which also is a favourite encampment of the Shukerieh, and consists of a chain of mountains, running east and west, several of them higher than Mandera, but, like it, composed of blocks of granite, separated from each other by ravines, clothed with beautiful trees, and having on their summits, sides, and at their feet, a number of natural basins, which retain the rain-water, and keep it fresh and cool even in the greatest heats. I here saw the remains of a wall which appears ancient; it incloses a beautiful valley in which the Arabs encamp.

'From the relation of Burckhardt you already know *Gous Regeip*, so that I shall not now say anything of it; but, as to the reported antiquities on the neighbouring mountain, be assured that nothing of the kind exists. On that mountain there are only blocks of granite, singular from the manner in which they are placed, and which the natives may possibly have mistaken for buildings. They are a retreat for robbers. At the top of the mountain a tolerably large natural grotto is formed of great blocks of granite, where these bandits place themselves, and see everything that passes on the plain beneath within a great distance; they are in perfect safety also, provided they have a good stock of water, and the river is only about a mile distant. The Sheikh Goutal, an Adindao, not subject to the Pasha, having come to see me, I engaged him to take me to visit the mountain; and as he was Sheikh of the robbers themselves, who are all Adindaos, they had the politeness to retire to the plain while I inspected their quarters, where I found nothing ancient, nor even wrought, except the tomb of a Mussulman saint, which they believe to be old. I was not laid under the slightest contribution; but I made my hosts a present of a cow, with which they were delighted. And there the Sheikh of the Bisharis, of the Shukerieh, and the Sheikh Goutal, proposed to accompany me as far as the Bahr Abiad.

'I also visited the principal tribes of the Shukeriehs and Bisharis, whom I found, contrary to what I had heard, both friendly people. The Shukeriehs are handsome men, with fine countenances, tall, and not black, but like the Abyssinians; the Bisharis are short, thin, and black; the former are proud, but more polished and less debauched than the others; the latter are affable, complaisant, lively, and gay. I collected, during this journey, some minerals, plants, and skins of birds; and also made some astronomical observations; but the time of my chronometer was deranged, I suppose, by the motion of the dromedary.

'On leaving Gous Regeip I followed the course of the *Astaboras* for three days, and then turned direct for Shendy. Our road lay constantly across plains covered with grass, but on which there were few trees compared to the numbers I had seen near the banks of the Nile. We did not meet a single mountain, and only a few slight elevations, till within a day's march of Shendy, when we came within sight of the mountain Colboshir, and those on which are situate the pyramids. They rise out of a large valley, in which are wells of good water, and in which, accordingly, a considerable tribe of Gehaleime Arabs encamp winter and summer.

'The whole district of Atbara abounds in game, but especially hares, antelopes, and wild asses; I have frequently also heard lions. The wild asses are chiefly found below Gous Regeip; I have often seen twenty-five at a time, and antelopes in hundreds. The heat in the month of December was very disagreeable when we were exposed to the sun, and there was little wind; but otherwise it was cool enough; and we were even forced to halt two days on account of the cold, and light great fires to warm ourselves. The wind then came from the north, and blew strong.

'All the country above Gous and Shendy is unhealthy, and even the Arabs fear it. As to myself, I sufficiently witnessed its effects. The Sheikh of the Bisharis, my soldier, and other three persons who were with me, of whom two were servants, and the other was an Ababde belonging to Sheikh Ralif, were all seized with severe fevers during the journey between Gous Rageip and Shendy: and the soldier, in particular, gave me a great deal of trouble (as, indeed, do most of those people when seized with illness), crying and shouting in despair, and wishing to be left behind. I was forced to act with firmness, and even to tie some on their dromedaries, pushing on constantly by forced marches. I was afraid of being taken ill myself, and, in fact, was seized the very day after arriving at Shendy.

'Both my servants are now dead; and I have myself had a very long and severe attack, during which my spirits have been much depressed and my temper excited. I am told that these are usual symptoms of the complaint here, and that sometimes they reach even to madness. This year the epidemic has been peculiarly severe, whole villages have been depopulated; and the soldiers also have suffered much.'

II.—*Von dem Rechtszustande unter der Ureinwohnern Brasiliens.* Eine Abhandlung Von Dr. C. F. Ph. Von Martius. München, 1832. 4to.

(*On the State of Civil and Natural Rights among the Aboriginal Inhabitants of Brazil.* An Essay, by Dr. C. F. Ph. Von Martius.) Communicated by the Rev. G. C. Renouard, B.D. Foreign Sec. R. G. S.

Dr. Von Martius, whose merits as a naturalist and a scientific traveller have been long acknowledged, has undertaken in this Essay to ascertain the notions respecting civil and natural rights prevalent among the original natives of that part of South America which he visited; and, by comparing his own observations with the earliest accounts of the American nations, to determine what degree of civilization they had attained, how far they can be traced to one common stock, and what has been the cause of the almost endless variety of tribes speaking different languages, into which they are now divided. Whence, in short, it arises that, with an almost universal agreement in manners, habits, and occupations, in mental and personal qualities, the native Americans should be divided into such a vast number of separate nations, having no community of speech, and living, for the most part, in a state of hostility with each other.

'The indigenous race of the New World,' he observes, (p. 1,) 'is distinguished from all the other nations of the earth externally by peculiarities of make, but still more, internally, by their state of mind and intellect. The aboriginal American is at once in the incapacity of infancy and unpliancy of old age: he unites the opposite poles of intellectual life. This strange and inexplicable condition has hitherto frustrated almost every attempt to reconcile him completely with the European to whom he gives way, so as to make him a cheerful and happy member of the community; and it is this, his double nature, which presents the greatest difficulty to science when she endeavours to investigate his origin, and those earlier epochs of his history in which he has, for thousands of years, moved, indeed, but made no improvement in his condition. But this is far removed from that natural state of child-like serenity which marked, (as an inward voice declares to us, and as the most ancient written documents affirm,) the first and purest period of the history of mankind. The men of the *red race*, on the contrary, it must be confessed, do not appear to feel the blessing of a Divine descent, but to have been led by merely animal instinct and tardy steps through a dark Past to their actual cheerless Present. Much, therefore, seems to indicate that the native Americans are not in the first stage of that simple, we might

say, physical (naturhistorischen) development,—that they are in a secondary regenerated state.'

With these views the author proceeds to the consideration of all those rights and mutual relations without which society, in its least complicated form, cannot exist, ascertaining, with regard to each, how far they are recognized by the natives of America in general, and by those of Brazil in particular; and prefacing the whole by 'a glance at the social condition of the wild inhabitants of that country; since an admission of rights, and relations dependant on those rights (ein Recht und rechtliche Verhältnisse), presuppose a history and a peculiar state of society which has arisen from it.'

'We behold in Brazil,' he observes, (p. 3,) 'a thinly-scattered population of aboriginal natives who agree in bodily make, temperament, disposition, manners, customs, and mode of living; but their languages present a truly astonishing discordance. We often meet with one used only by a few individuals connected with each other by relationship, who are thus completely isolated, and can hold no communication with any of their other countrymen far and near. Out of the twenty Indians employed as rowers in the boat in which we navigated the streams of the interior, there were often not more than three or four who understood any common language; and we had, before our eyes, the melancholy spectacle of individuals labouring jointly, though entirely isolated with respect to everything which contributes to the satisfaction of the first wants of life. In gloomy silence did these Indians ply the oar together, and join in managing the boat, or in taking their frugal meals;—but no common voice or common interest cheered them as they sat beside each other during a journey of several hundred miles, which their various fortunes had called them to perform together.'

To ascertain the number, affinities, and relative position of these tribes is a task of no ordinary difficulty, which, for various reasons, has never been completely executed. Only three distinct nations, (one of which, the Tupís, was subdivided into nine tribes,) are mentioned in the earliest Portuguese authorities. De Laet, about half a century later, enumerates seventy-six hordes or clans; Hervas, one hundred and fifty years after him, says that at least one hundred and fifty different languages and dialects are spoken in Brazil; and Dr. Von Martius's own inquiries have furnished more than two hundred and fifty different names of nations, hordes, or tribes at present found in that country. But it is by no means certain that all these names belong to nations or tribes essentially distinct; and the real amount of the indigenous population cannot be inferred from them, as some belong to very

small clans, or even single families. 'To guide the inquirer through the intricacies of this labyrinth, there is not a vestige of history to afford any clue. Not a ray of tradition, not a war-song nor a funeral lay can be found to clear away the dark night in which the earlier ages of America are involved!' All that can now be affirmed with any certainty, is that the Tupís, whom the Portuguese found almost everywhere settled on the coast, were a numerous and powerful people, split into many tribes, often at war with each other, but agreeing as to their habits in all essential points, and speaking dialects of the same language. They probably migrated in various parties from the countries on the banks of the Paraguaï and La Plata to the North and North-East, as far as the river of Amazons and the ocean. They were not, however, the only nation occupying that vast territory; but, from the very extensive currency of their language, must be considered as the dominant race. This is proved by many names of places throughout Brazil, which are significant words in the Tupí tongue; and this people is to Brazil, what the Caraibs were to the north-eastern part of South America,—those who spoke the Kichwa (Quichua) language to Lower, and those who used the Aïmarà to Upper, Peru. The Opiacàs and Cahahivas, between the principal branches of the river Tapajoz, far in the interior of Brazil, are now the only remains of this widely-extended people who still retain their independence. But as no Europeans have ever visited those remote tribes, our information respecting their notions of civil and natural rights must be derived from the earliest writers; or from inferences suggested by the habits of other tribes living in a state of independence, though their affinity to the Tupís has either never been investigated, or is at best very doubtful.

The most powerful tribes now extant are found in the southern and central parts of the country. The Guaïcurùs in Paraguaï, amounting to 12,000; the Cajapós and Cherentes in Goyaz, 8,000 each; the Mauhés, 16,000; and Mundrucús, 18,000, on the Tapajóz. 'To the north of the river of Amazons there is an extraordinary number of small hordes and tribes, bearing the most dissimilar appellations, as if the original population, displaced by still more frequent emigrations, wars, and other unknown catastrophes, had here been broken up and split into feebler aggregations. These hordes are found consisting of only one or at most a few families, entirely cut off from all communication with their neighbours; cautiously concealed in the gloom of their primeval forests, from which they never issue except when terrified by some external cause; and speaking a highly impoverished and crippled language,—the afflicting image of that hapless state in which man, oppressed with the curse of his existence, as if striving to fly from himself, shuns the approach of his brother.'

After these preliminary remarks, the author observes that many of the more populous tribes are subdivided into hordes and families, and that such subdivisions have a character of consanguinity or citizenship. Their names are often patronymics, their features and complexion indicate a similarity of origin, and they are less frequently at war with each other. Members of the same tribe are usually distinguished by a similarity of ornaments, or the same mode of tattooing, handed down from father to son, with a superstitious veneration for the customs of their forefathers which is universal among the American Indians. This family-feeling is indeed the foundation of all the engagements, in which they act in concert,—animates them to hunting excursions, in the fruits of which all participate,—and arms them against the common enemy. This appears to be the bond which originally cemented together the most powerful tribes, and enabled them, in the course of time, to obtain a supremacy over their less united neighbours. But these ties, as well as those of commercial intercourse, have only a very slight hold on the nation as a community. Their continuance and force depend upon the ability and perseverance of the chief by whom the tribe is governed, just as his own power and influence depend upon his personal superiority in strength and enterprise to the rest of his countrymen. Among the Brazilians bodily strength, activity, courage, cleverness, and especially an elevation of mind, very rare among the Indians, which makes a man ambitious to think for others, to lead and command them,—these are the qualities which place a chief at the head of his tribe. The dullness and indolence of the greater number render it easy for any one who has talent and activity to assume the command on the death of his predecessor, without the advantages of relationship; and his authority is maintained rather in virtue of his undisputed superiority in the qualities requisite for a chief, than by any formal investiture and appointment on the part of his countrymen.

Having thus shown that the ties of kindred, and a tacit acknowledgment of superior powers, mental and bodily, are the principal sources of authority and influence among the nations of Brazil, the author proceeds to inquire into the consequences of the authority thus obtained; and considers, in succession, the power, insignia, and occupations of the chief, the popular assemblies by which he is assisted or checked, the total absence of tribute and hereditary privileges, the state of castes, slavery, and some singular customs among the Indians, comparing, as he goes along, the usages of the Brazilians with those of the other aboriginal Americans. The general result of these observations is, that the chief has more uncontrolled power in time of war than in peace,—that in confederacies, the common chief, among a number, is sometimes chosen by the issue of a trial of strength,—that slaves

are almost invariably prisoners of war, and usually well treated though considered as a degraded race,—that slavery, as a punishment for crimes, is unknown,—and that something like a caste is found in some tribes, as, among the Guaïcurús, there are men dressed like women, engaged in female occupations, and called by the populace Cudinas, *i. e.* eunuchs.

Like the natives of some parts of Africa, the American Indians have no systematic form of religion, nor any priesthood. Their Pajés, the most distinguished personages in each clan next to the chief, are supposed to possess more than human power and knowledge; but they are merely conjurors and doctors who deal in spells and charms, without practising any thing like a form of religious worship. Their skill in interpreting dreams and omens, as well as their supposed preternatural gifts, gives them a high degree of political importance; and no public measure is undertaken without their concurrence. They are not less consulted concerning private affairs, and they thus become acquainted with all the secrets of the community. Prepared from their infancy for these important functions, and tried by a long noviciate of solitude, abstinence, and penance, they are at length admitted, with certain ceremonies, as duly qualified members, into this Sacred Order. These soothsayers pretend to have a secret intercourse with some superior agents,—have also sorceresses acting under their direction, and sometimes profess to be guided by a chief of their own Order, whose sanctity and spiritual perfection enable him to live in the most inaccessible retreats in the mountains, far from men, without food, and in an uninterrupted intercourse with higher beings. But all who are suspected of exercising superhuman arts for the purpose of injuring others, are objects of the bitterest scorn and hatred; and the Pajés themselves often turn this abhorrence of witchcraft to their own ends, by charging it upon their rivals;—as, when a disease proves too obstinate to yield to one of these doctors' incantations, he hints that his patient is bewitched by the spells of some other, and the supposed malefactor is almost sure of being dispatched by the friends of the sick man, or by order of the Chief.

Property, whether public or private, moveable or immoveable, its acquisition, preservation, and use, are the next subjects brought under the reader's notice. No tribes but the wandering houseless Muras (pp. 13, 33), the gypsies of Brazil, are entirely ignorant of agriculture. Each has its proper hunting-grounds marked by well-known boundaries; and, wherever settled for a time, each tribe or family has its own plantation, which is cultivated by the women for the use of the community. Huts and utensils are considered as private property; but even with regard to them certain ideas of common possession prevail. The same hut

is often occupied by more families than one; and many utensils are the joint property of all the occupants. Scarcely any thing is considered strictly as the property of an individual except his arms, accoutrements, pipe, and hammock. Theft and robbery are almost unknown; and the death of a parent leaves to his family, as during his life-time, the usufruct of all that he had. Accumulation of property, or any thing beyond a supply for present wants, seems rarely, if ever, to be thought of by this simple people. Objects of peculiar utility, or ornaments of extraordinary beauty, are the only thing which tempt a Brazilian to steal; and when detected, he is punished by restitution, stripes, and wounds, the Chief himself often acting as executioner.

Ornaments, especially trophies of skill or prowess, are the possessions most highly prized; and no offer, however tempting, could induce a Mirania (Miranha) to part with a necklace of very large ounce's teeth, a memorial of his boldness in the chace (p. 40.) But such valuables are sometimes given as pledges for the performance of a promise; and his rosary of human teeth, the skull of his enemy, or the stone stuck by way of ornament in his lip, are occasionally left as a security by the Brazilian chief when he wishes to convince his ally that he means to fulfil his engagements.

The trade of the Indians is, of course, merely a barter; but those who have most intercourse with Europeans form a store of goods for that purpose. The Mauhé carves bows of red wood, and prepares the Guaraná paste, of which utensils are made; the Mundrucu makes ornaments of party-coloured feathers; the Mirania women weave hammocks of palm-fibres, which are carried for sale as far as Surinam and Essequebo; and most of the tribes deal in flour and rear poultry. Beans of various kinds often serve, like kauries in India and Africa, as a medium of exchange. Loans and deposits are the only kind of securities of which they have any notion: provisions are sometimes, though seldom, borrowed; and pledges, as before observed, are occasionally given. When about to trade they mutually lay down their arms; and on concluding the bargain, each party seizes them again, in measured time, with a wild but serious expression of countenance, as if to imply a readiness to enforce completion, if necessary, by dint of arms. This is not the only symbolical act usual among the Indians; and when they wish to give the force of an oath to an affirmation, they put their hand into their hair, or hold it over their head. Though they carefully pluck the hair out of their beards and from every other part of the body, that of the head is an object of great respect and attention; baldness, which is very uncommon, is considered disgraceful. Kissing and shaking hands are unknown among them; but they rub their foreheads together

as a sign of friendship and hospitality, and clap their hands with outspread fingers, in token of satisfaction on finishing any business. The master of the hut always receives a stranger lying in his hammock; a sign is made to him to partake of the common meal; and when the father of the family offers the cigar out of his mouth, the guest may rest assured that the rights of hospitality will be neither withheld nor violated. A spear stuck into the ground at the boundaries, and a notched tally, are emblems of war; a present of finely carved bows and arrows are indications of peace. Many and rare are the ceremonies by which the youths are publicly received as men by the rest of the tribe; they appear to be symbolical of courage, fearlessness, endurance of pain, and abhorrence of enemies. Among the Passés the chief marks his son's fitness to bear arms, by making a long wound on his breast with a sharp tooth, or the beak of a bird.

Though they go alone to the chase, the game taken is considered as family-property, and is therefore buried, that the wife and children may go to the forest, dig it up, and bring it home. When more than one go out together, the game is the property of him who brings it down. No man can use the weapons of another, especially the air-gun or blow-pipe, which is supposed to be spoiled by the touch of a stranger. Their hunting-parties are formed for the purpose of attacking dangerous beasts of prey or monkeys, which they kill in great numbers, skin, embowel, and dry over the fire, as an article of food. The limits of their hunting-grounds are strictly observed, though nothing like an exclusive right of hunting in particular districts is claimed or possessed by their chiefs.

Marriage, among these Indians, is not accompanied by any religious or civil rites. The woman, chosen by a man for his wife, is demanded and purchased from her parents, either by gifts or labour, and delivered over to her husband without being consulted as to her own inclinations, becoming forthwith his slave and drudge. Monogamy is most common, though polygamy is not prohibited; and the chiefs have often several wives. The one first taken has usually a superiority in domestic concerns over the rest; but the husband generally exercises no very gentle authority over his wives, and keeps them completely in subjection. They often marry into families of weaker tribes in order to entice their wives' relations to settle near them, and thus increase the number of their fighting men. Among the Guaïcurûs, as was the case with the Caraïbs, the women speak a different language from the men. Perhaps this originated in their having settled in a conquered country, of which the women only were allowed to live. Wives obtained by rape are not uncommon; and some tribes habitually steal their neighbours' daughters. Among

the Chavantes rival suitors decide the question by a trial of strength, and the best porter, runner, or thrower, carries off the prize. As a stoical indifference to pain and pleasure is the great criterion of manly excellence among these as well as the North American Indians, it is the custom among some tribes for the bridegroom to abstain from meeting the bride for a greater or smaller length of time after marriage; and in three at least, the Pajé, like the feudal lord of former times in some parts of England, enjoys the *jus primæ noctis*. An evening visit to the intended bride's abode, and a present of bananas, are the usual preliminaries; a kind whiff or two of the suitor's cigar, taken by his future father-in-law, is the token of acceptance; necklaces and ear-rings of shells, beads, or seeds, anotto and genipapo for red and black paint, with some gay feathers and trinkets for the lady's dress, are the bridal gifts destined to secure her affection; and a mighty drinking-bout, in which all the relations take part, closes the marriage festival.

The limits within which marriages are allowed vary greatly; but union with a sister, or a brother's daughter, is almost universally held to be infamous. In small, isolated hordes, however, such practices are not uncommon; but the ancient Tupinambases (ancestors of the Tupís) allowed nothing of the kind openly; and the Yameos, on the river of Amazons, will not suffer an intermarriage between members of the same community, as being friends in blood, though no real affinity between them can be proved. In almost all the Brazilian tribes, the next brother, or nearest relation, must, on the death of a married man, take his widow to wife, and her brother his daughter; these marriages being compulsory, and in direct contradiction to the prohibitions mentioned above. The wife is, as commonly among savages, entirely at the disposal of her husband; her person is offered to strangers; she is sometimes lent to another, and liable to be dismissed at her husband's pleasure. Adultery is considered as a crime only on the woman's side, and often punished by the injured husband with death. Some tribes are more severe than others in these cases; but the husband himself seems to be sole arbiter in all, unless the family of the wife interfere, and are strong enough to prevent him from taking vengeance. A community of wives or husbands is unknown among the Brazilians; but infanticide is extremely common. The Guaïcurú women never rear any children before their thirtieth year. The Guanás, on the Paraguay, bury their female children alive, and even the mothers expose (not unfrequently) their new-born infants. On the father's side scarcely any thing like parental affection is known: till of age the child is entirely at the father's disposal; and then, in his fourteenth, or fifteenth year, he undergoes the trial of strength already mentioned, is declared by the whole community to have come to man's estate,

receives a new name, and becomes entirely his own master. The girls are subject to their father till they marry. Education, properly speaking, is unknown: the father tolerates the children, the mother makes use of them; but the Brazilians seldom if ever sell their offspring, except to their white neighbours. Respect and obedience on the part of children towards their parents, are equally unknown. The widows sometimes dig up and cleanse the bones of their deceased husbands, or preserve part or the whole of their bodies; but these cases are not common. Infants, especially orphans, are often neglected entirely, and left to die of want; and many tribes put the aged and infirm to death, in order to release them from life, which is now a burden. Among the ancient Tupís, when the Pajé despaired of a sick man's recovery, he was, by his advice, put to death and devoured.

The law of retaliation is firmly established among the native Brazilians; and, as elsewhere, is a constant source of private feuds and public warfare. Prisoners of war, being in such cases considered as objects of vengeance, are usually massacred in cold blood, with the most cruel and lingering tortures; but, by some tribes, they are previously fattened, for the purpose of affording a more delicious meal. When blood is shed, either designedly or accidentally, by one of the same tribe, the Chief can insist upon the acceptance of a compensation by the family of the deceased, especially if he had no near relations. Smaller offences and quarrels, such as arise continually in drinking-bouts, are commonly settled by a boxing match; and the victor is, of course, considered as being in the right.

Such is the general result of Dr. Von Martius's researches: at so low a point in the scale of intellect must the aboriginal Brazilians be placed; and this, with few exceptions, is, in his opinion, the case throughout America. 'While, in other parts of the world,' he observes (p. 78), 'we see various degrees of intellectual development and retardation simultaneously and proximately occurring, the ever-varying consequences of the changing course of events,—the whole aboriginal population of America, on the contrary, exhibits one monotonous poverty of intellect and mental torpor; as if neither internal emotions, nor the impression of external objects, had been able to rouse and release them from their moral inflexibility. This,' he adds, 'is the more astonishing as it appears to extend from pole to pole, and applies to the inhabitants of the tropics as well as to the natives of the frozen zones. Yet,' he continues (p. 79), 'this rude and melancholy condition is, beyond a doubt, not the first in which the American was placed; it is a degenerate and debased state. Far beyond it, and separated by the obscurity of ages, lies a nobler Past, which he

once enjoyed, but which can now be only inferred from a few relics. Colossal works of architecture, comparable in extent to the monuments of ancient Egypt, as those of Tiahuanacu on the lake Titicàca, which the Peruvians, as far back as the time of the Spanish conquest, beheld with wonder as the remains of a much more ancient people, raised, according to tradition, as if by magic, in a single night,—and similar creations, scattered in enigmatic fragments, here and there, over both the Americas,—bear witness that their inhabitants had, in remote ages, developed a moral power and mental cultivation which have now entirely vanished. A mere semblance of them—an attempt to bring back a period which had long past by, seems perceptible in the kingdom and institutions of the Incas. In Brazil no such trace of an earlier civilization has yet been discovered, and if it ever existed here, it must have been in a very remotely distant period; yet still, even the condition of the Brazilians, as of every other American people, furnishes proofs that the inhabitants of this New Continent, as it is called, are by no means a modern race, even supposing we could assume our Christian chronology as a measure for the age and historical development of their country. This irrefragable evidence is furnished by nature herself in the domestic animals and esculent plants by which the aboriginal American is surrounded, and which trace an essential feature in the history of his mental culture. The present state of these productions of nature is a documentary proof that, in America, she has been already, for many thousands of years, influenced by the improving and transforming hand of man.' 'The dumb dog, the guinea-pig, the turkey, jaçami, hoccos, as domestic animals; the llama (lyama) as a beast of burden; the guanacos and vicunnas (vicunias), caught to be shorn, are all so many evidences of this pristine civilization of America.' How ancient the domesticity of these animals was, appears especially from the circumstance that the lyamas were honoured as sacred animals by many of the Peruvians; and wherever we find elsewhere a similar worship of beasts, it goes back to a mythological period at the very dawn of history. The people of Huanca worshipped the dog; others adored maïz. The cultivation of that plant is extremely ancient among the Peruvians; and it, the banana, cotton, medicinal bark-tree, and cassada-root, are no more to be found wild in America than the different kinds of grain in Europe. The only palm (Gulielma speciosa) cultivated by the Indians has lost by culture its large stony kernel, which is often reduced to fibres, or entirely obliterated. The banana, in like manner, the introduction of which into America cannot be historically demonstrated, is always found without seeds. But it is known, by actual experiment, how long a time is necessary for the pur-

pose of communicating to plants such an impression of the transforming power of human influence. In America, certainly, the native plants useful to man have been tributary to him for innumerable ages. In reference to this, only two cases can be imagined. Either those useful plants have been so altered by their intercourse with mankind, that their pristine type (urtypus), though still extant, is so changed as to be no longer recognized,—or the influence of man on them has been such as to deprive them of the power of existing independently, and they are only capable of leading an ennobled, but artificial life, in the neighbourhood of men. The deep thinker who, in his "System of the Universe," labours to embrace all the various directions in the consciousness of man as so many necessary acts of a single and inwardly absorbed process, acknowledges, as a sort of magic, the power exercised by the human race in that ante-historic period, even upon the vegetable world; when, from a state of unshackled freedom, it formed itself into tribes, and firmly established itself in fixed places of abode. This idea, which stretches its view into the most distant obscurity of the primeval ages of our species, meets my conviction, that the first germs of development of the human race in America can be sought no where except in that quarter of the globe.'

'Besides the traces of a primeval, and, in like manner, ante-historic culture of the human race in America, as well as a very early influence on the productions of nature, we may also adduce as a ground for these views the basis of the present state of natural and civil rights among the aboriginal Americans. I mean precisely, as before observed, that enigmatical subdivision of the natives into an almost countless multitude of greater and smaller groupes, and that almost entire exclusion and excommunication with regard to each other, in which mankind presents its different families to us in America, like the fragments of a vast ruin. The history of the other nations inhabiting the earth, furnishes nothing which has any analogy to this.'

'It might be said, that the nations of the ancient world, like the different formations of rock which form the surface of our planet, were placed, as it were, in strata over each other. Accordingly, as the Genius of mankind piled them thus one upon another in greater or smaller masses, many have disappeared, without leaving a trace behind, as if they were overwhelmed by the succeeding races; others present themselves to us like the rocks, termed regenerated, as a mixture of originally distinct elements combined, disjoined, and again re-united under the influence of various relations. The oldest traditions and histories mention only a few considerable nations; the nearer we come down to our own days the more individualized do we find them, within certain limits, with respect to language, manners, and position. In unravelling such his-

torical developments, the inquirer must adopt almost the same method as the naturalist, for, as the latter endeavours to determine successive formations of different series of rocks from fragments of organized bodies no longer existing as such, so does the latter, from languages and various manners and customs, transplanted, either pure or adulterated, from the obscurity of a primeval period into the living use of nations of a later date, acquire certain hints as to the existence and condition of man in earlier ages. When we consider the primeval population of America in this point of view, especially when we examine minutely its continued subdivision to the utmost extreme, into small, often completely isolated, families, tribes, and hordes, it appears to us,—to pursue our physical illustration,—like a human formation reduced to atoms by the incessant action of volcanic powers. With these views we may hold ourselves justified in giving to the actual condition, social and moral, of the red race of men, who are, properly speaking, in a total ignorance of every social tie, an important historical interpretation. This disrupture, I mean, of all the bands by which society was anciently held together, accompanied by a Babylonish confusion of tongues multiplied by it,—the rude right of force, the never-ending tacit warfare of all against all, springing from that very disrupture,—appear to me the most essential, and, as far as history is concerned, the most significant points in the civil condition of the Brazilians, and in general, of the whole aboriginal population of America. Such a state of society cannot be the consequence of modern revolutions. It indicates, by marks which cannot be overlooked or disputed, the lapse of many ages. The period at which such a state began to exist, appears, moreover, to be necessarily the more remote, the more universally the natives of North and South America have been driven, by some cause hitherto undiscovered, into so complete a subversion of their original communities (Völkermassen), and into a confusion of tongues so pregnant with mischief. Long continued migrations of single nations and tribes have doubtless taken place from a very early period throughout the whole continent of America, and they may have been especially the causes of dismemberment and corruption in the languages, and of a corresponding demoralization of the people. By assuming that only a few leading nations were at first, as was the case with the Tupí people, dispersed like so many rays of light, mingled together and dissolved, as it were, into each other, by mutual collision; and that these migrations, divisions and subsequent combinations have been continued for countless ages, the present state of mankind in America may assuredly be accounted for; but the cause of this singular misdevelopment remains, no less on that account, unknown and enigmatical. Can it be con-

jectured that some extensive convulsion of nature,—some earthquake rending asunder sea and land—such as is reported to have swallowed up the far-famed island of Atlantis—has there swept away the inhabitants in its vortex? Has such a calamity filled the survivors with a terror so monstrous, as, handed down from race to race, must have darkened and perplexed their intellects, hardened their hearts, and driven them, as if flying at random from each other, far from the blessings of social life? Have, perchance, burning and destructive suns, or overwhelming floods, threatened the man of the red race with a horrible death by famine, and armed him with a rude and unholy hostility, so that, maddened against himself by atrocious and bloody acts of cannibalism, he has fallen from the godlike dignity for which he was designed, to his present degraded state of darkness? Or is this *inhumanness* (Entmenschung) the consequence of deeply rooted preternatural vices, inflicted by the Genius of our race (with a severity, which to the eye of a short-sighted observer, appears throughout all nature like cruelty) on the innocent as well as on the guilty?'

'On putting such questions, it is impossible entirely to discard the idea of some general defect in the organization of this red race of men, for it is manifest, that it already bears within itself the germ of an early extinction. It appears as if destined by nature, like the representative of a certain step in human civilization, to remain stationary as an automaton in the great machine of the world, rather to deter than to act. The Americans, it cannot be doubted, exhibit symptoms of approaching dissolution. Other nations will live, when these unblessed children of the New World have all gone to their final rest in the long sleep of death. And what memorial will they have left behind? Where are the creations of their intellect? Where are their poems and heroic lays? Where are the monuments of their arts and sciences? Where are the precepts of their faith, or their deeds of heroic devotion to their country? Even now these questions remain unanswered; for such noble fruits have never yet perhaps been brought to maturity by that race of men; and whatever be the questions which posterity may put, an unsatisfactory reply is all that a melancholy echo can return. The songs of those nations have long ceased to resound; the immortality of their edifices has long been mouldering; and no elevated spirit has revealed itself in any noble effusions from that quarter of the globe. Without being reconciled with the nations of the East, or with their own fortunes, they are already vanishing away; yes, it almost appears as if no other intellectual life were allotted to them, than that of calling forth our painful compassion; as if they existed only for the negative purpose of awakening * our astonishment, by the spectacle of a whole race of

* The translator supposes *erzwecken* to be an error of the press for *erwecken* (p. 85);

men, the inhabitants of a large portion of the globe, in a state of living decay.

'In fact, the present and future condition of this red race of men, who wander about in their native land, without house or covering,—whom the most benevolent and brotherly love* despairs of ever providing with a home,—is a monstrous and tragical drama, such as no fiction of the poet ever yet presented to our contemplation. A whole race of men is wasting away before the eyes of its commiserating contemporaries; no power of princes, philosophy, or Christianity, can arrest its proudly gloomy progress towards a certain and utter destruction. And from its ruins there arises, in the most motley combination, a new and reckless generation, anxious only to estrange, as completely as possible, their newly acquired country from its former masters. The East brings blood and blessings; social union and order; industry, science, and religion; but with selfish views, only for itself: for itself it erects a new world; while the race of men, which was once here the master, is fleeting away like a phantom from the circle of existence!'

'These lessons, derived from the history of futurity, are important though humiliating; but man regains his courage and cheering hopes, when he recurs to that noble reflection—which gleams like a distant meteor in the dark soul of the savage—that the fortunes of mortal men are overruled by Eternal Justice.'

Such is the theory of Dr. Von Martius, of which it has been the object of this paper to give a faithful transcript. The objections to which it is liable could not perhaps with propriety be stated here, and it may be sufficient to add, that the author seems to have overlooked that leading difficulty,—its being entirely irreconcilable with the only authentic documents of the early history of mankind now extant.

The author has added, in the form of an appendix, which some of his readers will perhaps consider as the most valuable part of his work, 'An Enumeration of the various Indian Nations, Tribes, and Hordes, at present found in Brazil.' It is, with the exception of some unimportant omissions, as follows:—

1. *Tupís* † or *Tupinambases:* formerly the most powerful and

if it be not, the passage must be rendered 'for the purpose of making our astonishment, &c., its object.'

* See the last message of President Jackson, at the opening of the twenty-second session of Congress.

† In the orthography of the proper names, *k* and *j* have been substituted for *qu* and *x*, *s* for *c* or *z*; and, in a few instances, *ng* for *õ* or *m*. The vowels must be pronounced as in Italian, the consonants as in English, except *kh* which represents the Scotch, Irish, and German *ch* in *loch*, *bach*, &c. The accented syllables have the emphasis, which is to be placed on the penultima in unaccented words.

widely extended people in Brazil; at present, through the predominance of the Whites, either losing its nationality and language, or already extinct. (For conjectures on the migrations and subdivisions of the Tupís, see Von Martius, Reise, iii. 1093, 1159, and the map attached to this Essay.) The name of this people has been variously interpreted. According to Vasconcellos (Chronica do Brazil, p. 91.), the place from which they first came is called Tupí: this seems to give the most correct etymology. Tupijaba, commonly contracted into Tujawa (Tuxaua), is the title of the chiefs, and originally signified 'Lord of the Tupís (Tupiava).' The proper names of the Brazilian tribes generally end in a or as, and are used by the Portuguese in the plural number.

According to the oldest Portuguese document, the Noticia do Brazil, written in A.D. 1589, and published in the Collecçaõ de Noticias para a Historia e Geografia das Nações ultramarinas, que vivem nos Dominios Portuguezes, &c. (Lisboa, 1825, tom. iii., parte i.), the Tupís were subdivided into the following tribes:—

1. The Tamoyós, on the coast from Cabo de San Thomé to Angra dos Reys. (Ibid. p. 79, Southey, Hist. i. 184.) 2. The Papanasis in Epirito Santo and Porto Seguro. (Noticia, p. 65.) 3. The Tupinikíns, on the coast between Camamú and Rio de San Mattheus. (Ibid. p. 56.) 4. The Tupinaes, originally in the Recóncavo of Bahia, on the coast, from whence they had driven out the Kiriimurés; but subsequently, having been themselves expelled by the Tupinambases, in the southern part of the interior of the province of Bahia. (p. 308.) 5. The Amoipiras on the southern bank of the Rio de San Francisco. (p. 310.) 6. The Tupinambases, from Camamú to the mouth of the Rio de S. Francisco. (p. 273.) 7. The Pitogoares, in the province of Parahyba do Norte. (p. 23.) 8. The Caïtés to the north of the Rio de S. Francisco in Parahyba, the Rio Grande do Norte, and Ciarà. (p. 28.)

The accounts of these tribes given in the Noticia are now entirely obsolete. They were transcribed by Moraes de Fonseca Pinto, in 1759; from whose MSS. extracts have been published by E. Von Eschwege, in his Brasilien die Neue Welt. (i. 259.) See also Southey's History of Brazil (i. 42, 201, 228).

De Laet, in 1633 (Novus Orbis, p. 546.), names the following tribes of the Tupís:—the Petiguares, Viatan, Tupinambas, Caetas, Tupinakins, Tupiguas, Tumminiví, Tamuias, and Carioes.

Vasconcellos (Chronica da Companhia de Jesu do Estado do Brazil, Lisboa, 1663, fol.), in 1666, thus enumerates the tribes of the Tupí nation. The Tobayares, Tupinambás, Tupinakís, Tupigoaes, Tumiminos, Amoigpiras, Araboyaras, Rarigoaras, Poti-

guaras (with the hordes called Tiquari and Para-ibas), Tamojós (also called Ararapac, the Tamuias of De Laet), and the Cariyós (Carioes of De Laet), placed more properly among the Goyatacases. The Apantos on the Amazons River, and the Tocantinos or the Tocantíns, are also noticed as two tribes belonging to the Tupís.

At present the state of the Tupí people is greatly changed, as only a very small part of it has retained its freedom. From its extraordinary dispersion over a great part of South America, its remains, now frequently difficult to recognise, may be distributed into *five* distinct groupes, as Vater has traced their languages to three main branches.

A. The Southern Tupís or Guaranís (*i. e.* Warriors) in Paraguaï, Monte Video, and Rio Grande do Sul (*i. e.* Great South River). Their dialect is the purest and most copious (Vater's Mithridates, iii. 2. p. 431; Von Eschwege, Bras. ii., 163).

The feeble remains of this once populous tribe now consist of—

1. The Pinarés or Pinarís, south of the sources of the Uruguaï.
2. The Patos, formerly a clan of fishermen on the Laguna de los Patos (Lagoon of the Patos).
3. The Tapés or Tapís in the plains of Monte Video and on the Ybicuy in the province of Rio Grande do Sul.
4. The Guaïcanáns or Guanyanás (Gunhanás, Guanhanás, Guannanás), in the Campos de Vaccaria (Cow-fields) of the province of Rio Grande do Sul.
5. The Biturunas (Black-faces? Night-men?), south of the Rio Curitiba.
6. The Guaranís Proper, between the rivers Paranà and Paraguaï.

B. The Eastern or Proper Tupís or Tupinambases, scattered principally along the sea-shore from the Ilha de Santa Catharina (Isle of St. Catharine) to the mouth of the river of Amazons. They speak the proper Tupí tongue, now called the *lingua geral* (general language) of Brazil, and reduced to grammatical rules by Anchieta and Figueira (Vater, Mithr. iii., 2, 441). In the southernmost provinces, with perhaps the exception of San Paulo, the former existence of this language is scarcely known even by tradition, and the remains of the Tupí tribes are for the most part assimilated with the rest of the population.

The tribes belonging to this division, going from South to North, are—

1. The Tamojós, formerly very numerous and powerful on the bay of Rio de Janeiro, at present almost entirely extinct. Some remains of them inhabit the village of S. Lorenzo on the bay, and the Aldea da Escada (Reise, i., 213). The

Cafusos and Curibocas (or Caribocas), also called Cabres, frequently met with in the province of S. Paulo, are a mixed race, derived from Negros and Indians of this tribe. In Tierra Firme, individuals of such a mixed race are called Zamboloros; their children by Mulattas, Saccalaguas; and the children of Mestizos by Indian women, Cholos.

2. The Tupinikíns or Tupinakís, formerly settled in Porto Seguro and the Comarca dos Ilheos (sea-holm district) now occupying villages in Belmonte, Camamú, Valença, &c. (Reise, ii., 677).
3. The Tupinás or Tupinaës, from whom the Indios mansos (tame Indians), in the Villa de Cachoeira (Cataract Village), to the west of the Recóncavo de Bahia, are descended.
4. The Tupinambases, ancestors of the Indians last named, southwards and northwards along the coast from thence as far as Sergipe d'El Rey.
5. The Obacatuaras (from Oba-catu-waras, *i. e.* good woodmen), who inhabited the islands of the Rio de S. Francisco. Their descendants now occupy the coast in Sergipe d'El Rey, and the banks of the Rio de S. Francisco, especially the former Capuchine Missions.
6. Poti-waras (Potiguares or Pitigares of the older writers), properly Pito-wáras, *i. e.* tobacco-pipe men, from the aloë called Pita (Agave Americana) whence their pipes are made, or from *piter* to smoke. They dwelt chiefly in Parahiba do Norte and Ciará, and northwards as far as the former Comarca de Cumá in Maranhaõ (Manàniàng). Their dialect seems to have differed little from that of the southern Tupinambases, and their descendants form the small Indian population of the above-named provinces.
7. The Caïtés (Caëtés or Cahetés); once numerous in Pernambuco and Ciarà, now either settled in villages or extinct. The Guanacás and Jaguaranas (Ounce Indians) in Ciarà; as well as the Tramembés or Teremembés settled in villages at Nossa Senhora da Conceiçaõ (our Lady of the Conception) d'Almofalla, and the Kitariorís and Viatanis, now extinct, were mentioned to Dr. Von Martius as subordinate hordes of this tribe. Perhaps the Cahy-Cahys in Maranhaõ are also a relic of the Caëtés (Von Martius Reise, ii., 821.)
8. Tupajaros (Tobbajares), properly Tupí-waras, *i. e.* Tupí men. This name was formerly given especially to the Tupí Indians, inhabiting the northernmost provinces from Ciarà to Maranhaõ and Parà and the Serra do Ybiapaba. Remains of them still live in Paço do Lumiar (Threshold Court), Vinhaës on the Island of Maranhaõ, the Villa de Monçaõ and along the Rio Itapicurú (Cazal, Corografia Brasil. ii. 223;

Spix und Martius, Reise, ii., 831). Perhaps the Guajojaras, free Indians at the sources of the Rio Mearim (Mearing), and the hordes of the Manajós, also free and established in the same place, and in the district of S. Bento dos Pastos bons, west of the Rio das Balsas as far as the Tocatins, and settled at Vinhaës, are remains of the same tribe. Tabajari is a name which occurs in Guiana also (De Humboldt, Relation Hist. iii., 173.)

C. The Northern Tupís, remains of whom are found in Parà, Cametà, and on both sides of Amazons' river, as far as Topinambarana. They speak a very peculiar dialect of the lingua geral, and were formerly divided into the following hordes :—

1. The Taramambases, on the continent between the rivers Tury-açú (asú) and Caïté.
2. The Nhengahibas (Nyenga-ibas, *i. e.* Tongue-men) on Marajó Island.
3. The Pacajases, inhabiting the continent round that island, as did likewise, according to Acunna, the Apantos.
4. The Mamayamases.
5. The Anajases, and
6. The Guayanases, were all sea-faring hordes, also called Igara-waras, *i. e.* Boat-men.
7. The Tocantinos and
8. The Tochi, or Cuchi-waras, are said to have both come down the river Tocantíns, and settled at its mouth.
9. The Cambocas or Bocas lived on the Great Freshwater Bay, east of the mouth of the Tocantíns, thence called Bahia dos Bocas. They were settled in villages at Melgaço, Oeïras, and Portel.
10. Probably the Cupiniaros (Cupi-waras, *i. e.* Ant-Indians?) should be enumerated here as a particular branch of the Tupís. They are said to be still living in a state of independence on the Tocantíns, to the south of S. Pedro d'Alcántara.

The Portuguese name the Jurunnas (*i. e.* Black-faces) also as a part of the Tupís formerly settled in this country; but Dr. Von Martius suspects they had been driven by the Europeans from tracts farther West, and were not derived from the same stock. In that direction also there dwelt formerly still more hordes of the Tupí race, to which, among others, Acunna's accounts refer (Von Martius, Reise, iii., 1159), but that writer's accuracy cannot be depended upon.

To this place likewise belong—

11. The Cachig-uaras, Curig-ueres, Cumay-aris, Guacui-aris, Guac-ares, Yacuma-aras, Cuchi-uaras. Agua-yras, Canisiuras, and Paca-jares of that writer. Of all these names and

hordes no trace is any longer to be found on the Amazons' river. The word Ymirayares or Ibirajares, which appears on many old maps, signifies in the lingua geral, Wood-men (Ibira-wara), and is only the name of a particular tribe or horde of the Tupís. They are mentioned in the 'Noticia do Brazil' (p. 311), and the author translates the word correctly, Senhores dos páos.

12. The Omaguas, Homaguas or Campevas (Canga-apevas, *i. e.* Flat-heads), might be considered as a branch of the Tupí people, in some degree distinct, and probably separated at an early period from the main stem. They perhaps descended along the Madeira river into the northern part of the valley of the Amazons. The Sorimaús, Sorimoës, or Soriman (from whom the siver Solimoës takes its name), as well as the Yurimaús or Yuru-maguas, are probably hordes of this tribe, long since separated from their brethren who dwell farther to the south (see Von Martius, Reise, iii., 1193, and Veigl in Von Murr's Reisen einiger Missionarien, p. 79). According to some accounts, the Tecunas or Ticunas also belong to this stock, (Vater, Mithrid. iii., 2, p. 597). These Tecunas are, for the most part, still free; but the Omaguas and Campevas at Tabatinga, Olivenza, and other places on the Solimoës, are settled in villages, becoming a mixed race, and beginning to lose the language of their forefathers.

D. The Central Tupís are now the only portion living in a state of complete independence. Two of these tribes alone are positively known: the Apiacases and the Cahahibas (Caa-ivas, *i. e.* Foresters?) They occupy the upper parts of the Rio Tapajós, below the mouth of the Rio Juruena, and give a friendly reception to the few parties who go up the Tapajós from Cujabá. A large aldea (village), belonging to them on the right bank of the Arinos, consisting of lofty huts, has been visited by travellers. Perhaps the Uhahias on the lower Juruena, the Ababas to the north of the Serra dos Parecís in Mato Grosso, and the Mundrucús are derived from the same stock. Concerning these Tupís we have no accurate or detailed accounts.

E. The Western Tupís: to this class belong those tribes who, according to Vater (Mithrid. iii., 473), and Hervas (Idea dell' Universo, Roma, 1785, 4to. xvii., 23), speak the west Guaraní dialect. They are—

1. The Chiriguanas (Chirihuanas, Xiriguanos, or Siricuanos), in the province of Santa Cruz de la Sierra.
2. The Cirionós and
3. The Guarayós (Guarajúz). To these last probably belonged the Xarayas or Xareis, who dwelt in the annually

inundated countries on the Upper Paraguaï (Laguna dos Xareïs). The name of Chiriguanos has long since been given, in Upper Perú, to all unknown rude tribes addicted to cannibalism and living in hostility to the Indians settled in villages, just as Bugre or Botocudo is used in Brazil, (Garcilasso de la Vega, vii. c. 17). Thus in S. Cruz de la Sierra, the Guaïcurús, who venture to make incursions, are called Xiriguanos, (Prado, Jornal o Patriota, 1814, Jul., p. 16; Spix und Martius, Reise, i., 269).

The remaining tribes, not related to the Tupís, are as follow:

I. Between Rio de Janeiro and Bahia, especially in the woody mountains on the boundaries between Minas, Rio de Janeiro, Espírito Santo, and Bahia.

1. The Aïmorés (Aimborés, Aimurés, or Guaymurés), now called by the Portuguese, Botocudos. They call themselves Engeraeckmung, and are named Bokayú by the Coropós, and Bochorinbaïsshuna by the Coroados. They are also called Abatirás and Avakirás. At present they inhabit principally the Serra dos Aïmorés (Mountain of the Aïmorés) and the country eastward, between the rivers Pardo and Doce. One family of this tribe is formed by the Gherens, of whom some feeble remains are still found near the Rio Itahype (Martius, Reise, ii. 677, 683).

The Kinimurés, who were driven by the Tupinikins from the district of Bahia, appear to have belonged to this tribe. (See Noticia do Brazil. c. clxxxii. p. 311. Southey, Hist. of Brazil. i., 281. Cazal, Corografia Brazilica, i 56, 377, 391.)

2. Goïtacás (Goyatacaz, Guaitacæ, Waytaquases, in De Laet and Knives), of whom three hordes are at present known:—
   i. Goïtacá-mopí,
   ii. Goïtacá-asú, and
   iii. Goïtacá-Jacoritó.

Most of them are civilized, and settled between the rivers Macahé and Cabapuana. Others, still in a state of half-freedom, live in the woods on the Rio Xipotó (Jipotó) or Chopotó, in Minas Geraës. These are the Indians called Coroados (*i. e.* Tonsured). The Coropós call them Chakwibu. To these Goïtacases, or, as they are still sometimes called, Goya-tapwuja, the Goaïnases, who lived like the Goïtacás in subterranean caverns, undoubtedly belonged (Noticia do Brazil. i. 63, 85). The older accounts, also, make frequent mention of another tribe which belonged to this people: viz. the Cariós or Caryós (Carioes in De Laet), who dwelt to the west of the Goyatacases, occupying the Campos de Goyatacazes beyond the first woody chain of hills. The unsubdued remains of these Cariós are now called

Guarús,* (Guarulhos, Garulïos, Saguarús, or Sacarús). They wander about in small bodies in the woods on the Serra dos Orgaõs (Organ, Beam, or Portcullis Mountains), and in the meadows of the provinces of San Paulo. Descendants from them, settled in villages, are found, probably, in the mission of Aldea da Escada (Stair-case village), in the environs of Macahé, Ilha Grande, and the islands of St. Sebastiaõ, and Santa Catherina.

3. The Purís (Purys, or Pories), for the most part unconquered, but now at peace with the European settlers, occupy the upper part of the river Paraïba and the interior of the province of Espírito Santo, between the river so called and that named above. Also with the Guanias, on the Rio Iguassú (Cazal, i. 208. ii. 59), and on the Rio Xipoto (Spix und Martius, l. c. p. 373. von Eschwege, Journal von Brazil).
4. The Canarins, a small tribe, very little known, between the Rio Mucury and the Rio de Caravellas, in the Comarca de Porto Seguro.
5. The Majacarís (Maxacarís, Majacalís, or Machacarys) on the Rio Belmonte, and between it and the Rio do Prado in the same district. They were formerly settled on the Rio Mucury.
6. The Malalís, a small horde, now settled in villages in Passainha (Passainïa), on the Rio Seruhy Pequeno, the northern tributary of the Rio Doce, in the provinces of Minas Geraës (public mines).
7. The Patajós (Patachós, or Pataxós), on the Rio Mucury, along the sea-coast, between it and the Rio de Porto Seguro (River of Safe Harbour), between the sources of the Rio Pardo and the Rio de Contas, as well as on the declivity of the maritime chain (Cordillera) to the west of Ilheos (Cazal, ii. 74, 100. Prinz von Neuwied, Reise, i. 281).
8. Capojós, or Caposhós (Capoxós, or Capochós), migratory in the rocky mountain-woods on the boundaries between Minas Geraës and Porto Seguro (Martius, Reise, ii. 493).
9. Paniames (Panhamis, or Paniames), on the Serra das Esmeraldas (Emerald-mountains), and at the sources of the Rio Mucury, without any settled habitation. Martius, l. c.
10. The Camacans (Camacaẽs), called Mongoyós or Monxocós, (Mangajas in de Laet,) by the Portuguese, live near the Capochós, but principally between the Rio de Contas and the

* The *gua* is here probably, as is often the case in Portuguese words, to be pronounced *ga*. The English reader will also recollect that *j* and *x* in that language are equivalent to the French *j*,—*i. e.* to *zh* or *s* in *measure* and *ch* to our *sh*. Formerly *x* corresponded with our *sh*; and *ch*, as in Spanish, with our *ch*.

Rio Pardo in the province of Bahia. The Meniens in Villa de Belmonte are a domiciled horde of the Camacans. (Prinz von Neuwied, Reise, ii. 212.)

11. The Catachoïs (Catachoys), or the north-western boundaries of Porto Seguro, are little known. They are, probably, identical with a horde near Conquista, on the Upper Pardo, named Cutachós, or Cotochós, to Messrs. Spix and Von Martius. Their language, according to the specimens collected by those travellers, agreed very nearly with that of the Meniens, and shows that they belong to the Camacans, while the Patachós, of whose tongue the Prince de Neuwied has given a vocabulary (Reise, ii. 319), speak a very different language, and cannot therefore be derived from the same stock, as Dr. Von Martius once supposed. (Reise, ii. 694.)

12. The Cumanachós (Comanojos), a small tribe, neighbours of the Capochós.

13. The Sabujas (Sabuyas?) and

14. The Kiriris, formerly in the interior of the province of Bahia, to the south-west of the Villa de Cachoeira, now settled in villages in Caranquejo (Carankejo), and Villa da Pedra Branca. (Martius, Reise, ii. 615.)

15. The Macuanís (Macuanihs, Macoanís, Macunis, Macunins, or Maconís), originally occupying, together with the Cumanachós, &c., the woody mountains on the boundaries of Minas, Porto Seguro, and Bahia—at present settled partly on the coast near Caravellas, partly in the neighbourhood of the Quartel of Alto dos Boys (Ox-heights) in Minas Novas. (Martius, Reise, ii. 491.)

16. The Coropós (Cropós, or Carpós), who speak a language similar to that of the last-named tribe. They now live with the Coroados, along the Rio Xipotó, in the Presídio de S. Joaõ Baptista (Spix u. Martius, Reise, i. 375. Von Eschwege Journ. v. Bras.)

17. The Cachinés, or Cachinezes, a horde on the Serra Mantiqueira, in the province of Minas Geraës, now perhaps already extinct.

18. The Ararís (or Ararys), formerly on the Rio Preto (Black River), in the south-eastern angle of the province of Minas Geraës, now perhaps no longer existing.

19. The Chumetós; and

20. The Pittás; two hordes, the remains of which are said to be domiciled at Valença (Valensa), in the province of Rio de Janeiro (St. Januarius's River). (Cazal, ii. 25.)

II. In the provinces of S. Paulo, Rio Grande do Sul, and at Monte Video.

21. The Voturóngs (Voturoës); 22. Tactayás; and 23. Camés, dangerous banditti in the grassy meads of Guarapoava, in the province of San Paulo.
24. The Charruás; at first round the Lagoa Mirim, and southward as far as the Rio de la Plata; they afterwards retired farther into the interior of the country.
25. The Minuanos, or Minuanes, domiciled at Grapuetan and other places to the south of the Rio Ibicuï, in the province of Rio Grande do Sul. One of their hordes is called Cassapa-Minuanes.
26. The Kenuás (Quenuás, or Quinoás), on the Uruguaï, in the country also inhabited by the Patos, Guaïcanans, Guaranís, and Tappés, hordes belonging to the Tupí race already mentioned. The Abipón, or Abipones, originally dwelt between the rivers Pilcomayo and Vermejo (*i. e.* Vermilion, also called Innaté), on the borders of Brazil; but they have now migrated farther southward. (Dobrizhoffer, Abipones, ii. 4.)

III. In the province of Mato-Grosso (Great-Thicket).

A. On the Paraguaï* (*i. e.* Parrot-River).

27. The Guaïcurús, or Mbaya (Mbouyara), called Cavalleiros (Horsemen) by the Spaniards and Portuguese; but Enacagas, or Eyiguayegí, by themselves. Azara, who asserts (Viaggio, ii. 273) that the Guaïcurús are extinct, and different from the Mbaya, appears only to have had a single horde in his eye, for this nation is still populous. They now dwell chiefly on the eastern side of the Paraguaï, from 19° 28′ to 23° 36′ S. (Prado, Historia dos Indios Cavalleiros, in the Journal o Patriota, 1814, p. 14), and are sub-divided into seven hordes:
    i. The Pagachoteo; ii. Chagoteo (the two strongest); iii. Adioeo; iv. Atiadeo; v. Oleo; vi. Laudeo; Cadioco.

Prado remarks (l. c. p. 16), that the hordes living near the town of Assumption, are called Lingoás near that place, and Xiriquanos, or Cambaz, when marching in warlike expeditions towards Santa Cruz de la Sierra (Holy Cross in the Mountains). For an account of the Guaïcurús, see Von Eschwege, Journ. v. Brasilian; Spix u. Martius, Reise, i. 268; Cazal, Corografia Braz. i. 252, 275.
28. Guaná, or Guanans, formerly numerous and powerful at Chaco, on the west side of the Paraguaï, now between the Serra de Chaïnez and the river, besides those who are dis-

* The names of thirty-seven Indian tribes on the left and twenty on the right of this river are given in the older missionary reports from those countries, but, as it appears, very incorrectly.—(See 'Notice on the Chiquitos, p. 182.)

persed here and there and settled in the Prezídio de Miranda. Perhaps they belong to the following tribe.

29. The Caháns. This name, which does not appear to be that assumed by the people themselves, seems to be corrupted from Caa-huanas, *i. e.* woodmen, in the Guaraní tongue. By the Guaïcurús they are called Cajuvaba, or Cajababa, which also signifies woodmen. They live near the sources of the Amambahy, or Mambaya, one of the western confluents of the Rio Grande. The Portuguese call many of their hordes Coroados, *i. e.* shorn, or tonsured. Another horde, living near the sources of the Xingú (Jingú), is also called by that name; it perhaps belongs to the nation of the Bororós, among whom there are also shorn-headed tribes.

30. The Lengoás, or Lingoás, between the Pilcomayo and the Paraguaï, are sometimes represented as being a cognate tribe with the Guaïcurús, and, at others, as an entirely distinct people.

31. The Payagoà or Payaguás, called by themselves Nayaguà, and divided into two hordes; Cadigué and Magach, partly civilized and inhabiting the banks of the Jaraïs (Xarais) or annually inundated meadows, especially to the south of the Forte de Nova Coimbra. (See Mithr. iii., p. 488. Spix und Martius, Reise, i., 263.)

The Jarayes, Sacocies, Charneses, and Chakeses, who inhabited the neighbourhood of the Paraguaï in the beginning of the sixteenth century, (Southey, Hist. of Brazil, i. 135,) are now extinct. So the Bayas, also, a horde which appeared about the Fecho dos Morros (rocky enclosure) in the middle of the preceding century. (Cazal, i. 286.)

32. The Guatós, of a very fair complexion and friendly to the Europeans; in considerable numbers at the sources of the Tacoary and the ridge which separates it from streams flowing in an opposite direction; at the sources of the Araguaya to the north of Camapuáng (Camapuaõ), and domiciled in a civilized state here and there near the Paraguaï, *e. g.* at the mouth of the Rio de Lourenzo.

33. The Guarayós (or Guarajúz), formerly settled in villages on the Serra dos Guarajúz, now at Torres and Larangeiras. (Orange-trees.) Perhaps this may be a horde of the western Tupís;* its language is now said to differ very much from the Guaraní.

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* West and south-west of the Paraguaï, in the neighbouring territory, which does not now belong to Brazil, there dwell:—

A. Between the Pilcomayo and Paraguaï: 1, the Akiteghedichaga (remains of the Cacocy nation, according to Azara); 2, the Ninakila; 3, the Enimagas; 4, the

B. On the western side of the Campos dos Parecís, and on their declivity towards Guaporé:—

34. The Caupeses or Caupés, on the Campos, to the west of Camapuáng. They are said to dwell in caverns, and to stretch the skin of the abdomen so that it hangs down in front like an apron. (Prado, c. i. p. 15.)

35. The Pacalekes, called by the Portuguese Campevas, *i. e.* Flat-heads. (Descendants from the Tupís ?) At the sources of the Rio Mondego or Embetatohy.

36. The Guajis (Guaxis), a small tribe at the sources of the Rio Aranianyi, (Aranianhy).

37. The Cabijís, (Cabixí, Cabexí or Cabyxí,) a migratory tribe in the meadows of the Chapada dos Parecís; but living in permanent dwellings at the source of the Guaporé, Sararé, Piolio (Piolho), and Branco.

38. The Cabijís u Ajururís, (Red-stained Cabijís ?) a mixed horde at the sources of the Jamary and Jahira. (According to Franc. Ric. de Almeida Serra, in the Patriota for Dec. 1831, p. 58., whence the following enumeration of the other Indian tribes in Mato Grosso is taken.)

39. The Paresís (Parecís, or Paricys), formerly the predominant nation in the meadows of the table-land of Mato Grosso, called from them Campos dos Parecís. Through the misconduct of the Portuguese, who took every opportunity of

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Ghentusis; 5, the Yanrure; 6, the Machicuyos; 7, the Mataguayes; 8, the Pitilaguas; 9, the Tobas; 10, the Camacutás; 11, the Corometés.

B. In the district of Chikitos: 1, the Chikitos, some of whom are domiciled at Cazal Vasco, in Mato Grosso. They call themselves Nakiniyonneïs, (Nakinionyeïs ?) 2, Chirivones, (Ciriguanos, or Ciriuanos, from the western Tupís ?) 3, Taos; 4, Boros; 5, Tabyicas; 6, Tannopicas; 7, Ilhuberesas; 8, Sumanucas; 9, Basorocas; 10, Puntagicas; 11, Kibikibas; 12, Pekibas; 13, Boöcas; 14, Tubacicas; 15, Aruparecas; 16, Piococas, all of whom speak the Tao language.

17, The Piococas; 18, Kimecas; 19, Quapacas; 20, Kitagicas; 21, Pogisocas; 22, Motakicas; 23, Semukicas; 24, Taumocas, who all spoke the Pinnoco (Pinioco ?) tongue.

25, The Manacicas; 26, Sibacas; 27, Cucicas; 28, Kimomecas; 29, Tapucuracas; 30, Yuracarecas; and 31, Yurituacas, who spoke Manaci.

32, The Samucos or Chamucoccos; 33, Sahenos; 34, Ugaranios, who speak the proper Samuco; and 35, the Caïpotarade; 36, Tunachos; 37, Imonos; 38, Timinabas, whose dialect of the Samuco is called Caïpotarade.

39, The Morotocas; 40, Tomoënos; 41, Cucurares or Cucutades; and 42, Pananas, speak the Morotoca-Samuco.

B. At Molhos: 1, Mohhos; 2, Baures; 3, Movimos (Mobimas); 4, Erirumas; 5, Tapacuras; 6, Itonamas; 7, Hwarrayos (Guarayos ?) 8, Canicianas; 9, Bolepas; 10, Herécepoconos; 11, Rotoronyos; 12, Pechuyos; 13, Coriciaras (Coarace-wara, *i. e.* Sun-men ?) 14, Mekes; 15, Mures; 16, Sapis; 17, Cayubabas (Gayvabas); 18, Canacurés; 19, Ocoronos; 20, Chumanos; 21, Mayacamas; 22, Tiboïs; 23, Naïras; 24, Norrís; 25, Pacabaras (Paca-waras ?) 26, Pacanabas (Paca-abas ?) 27, Sinabus; 28, Cuïsaras; 29, Cabinas. (Southey, Hist of Brazil, iii. 200; from the Lima Almanac.) There Mohhos speak eight different languages according to the Almanac; thirteen, according to Hervas. Their names often appear to resemble significant terms in the Guaraní language.

hunting out and enslaving this peaceable and industrious people, it is now almost entirely extinguished. Fragments of it have united themselves to the Cabijís and Mambarés.

40. The Ababas; 41, Puchacás; and 42, Guajejús, in the woods on the three upper branches of the Corumbiara. The Puchacás are also found on the Juina, to the north of the Tamarés.
43. The Mekens (Mequens), a peaceful people on the Rio Mequens.
44. The Patitins, a numerous and respected people along the Upper Mequens.
45. The Aricoronés (Urucurynys); and 46, the Lambys, numerous on the Rio de S. Simaõ.
47. The Tumararés, between the Rio de S. Simaõ and Rio Jamary.
48. The Cutriás (Coturiás), or a northern branch of the former river, towards the Juina.
49. The Cautariós (or Cautaróz), numerous and suspicious, on the three streams of the Cautariós.
50. The New Pacas on the Rio Pacas Novas, a tributary to the Mamoré.

C. On the eastern part of the Campos dos Parecís and the northern declivity of this table-land:—

51. The Maturarés, to the east of the Cabijís, as far as the sources of the Arinos.
52. The Mambarés (Mambaréz), living partly mixed with the Cabijís on the Tamburina, the eastern branch of the Juruena. (The Apiacás and Cahahibas, free Tupí tribes who live at the confluence of the Juruena and the Arinos, have been already mentioned above.)
53. The Uyapas, a wild nation to the north of the foregoing.
54. The Mambriacás on the Tapajós, still farther below.
55. The Tamarés, on the Juina and Alto Galera.
56. The Sarumás, between the Jamary and the Tapajós.
57. The Ubahiás or Ubayhas (Uba-iras, *i. e.* woodmen ?) below the above.
58. The Jacuruinas (Xacuruinas) on the river of the same name.
59. The Guajajás, or (Quajajás); and 60, the Bacuris (or Pacurys), on the Arinos. Of the tribe from which this river takes its name no vestige now remains. (Cazal, i. 309)
61. The Camararés, on the river of that name, a branch of the Jamary.
62. The Guariterés (or Quariterés), at the sources of the Jamary and the opposite mountains of Guaporé.
63. The Baccaház, at the sources of the Juruena.

64. The Juruenas, on the river bearing that name.
65. The Cuchipós, formerly on the river Cujabá, and at the Hermida de S. Gonsalo, on the road from S. Paulo to Goyaz; now probably extinct.

IV. In the province of Goyaz and the neighbouring countries. The Goyas (Guayazes, Goyazes or Gwoyazes) from whom the province takes its name, formerly occupied the country about Villa Boa (good city); but they, as well as the Anicuns, are now extinct.

66. The Cayapós (Caipós or Cajopós), for the most part large-eared, inhabit the meadows on each side of the Rio Grande, in the southern part of the province of Goyaz, also between the Paraná and Paraguaï (Spix u. Martius, Reise, i. 268, ii. 574); sometimes settled in villages as in the Aldea de S. Maria. This populous and widely-spread nation generally shows a hostile disposition towards European settlers.
67. The Bororós, to the west of the sources of the Araguaya and north of the district of Cujabá, a numerous people wandering about in small bands, and hostile to the Portuguese. Two of their hordes are called Coroados and Barbados by the Brazilians (Cazal, i. 302). They are domiciled in Goyaz, Rio das Pedras, Lanhoso, Pisarraõ, and elsewhere.
68. The Baccahirys, at the sources of the Rio Xingú and Rio das Mortes. They are said to be very fair, and a tribe of the Parecís. (Cazal, i. 302.)
69. The Aroes or Arayes, on the Rio Claro das Mortes, and other southern tributaries to the Araguaya.
70. The Tappirapés or Tapirakés; and 71, the Chimbiwás (Ximbiuás or Ximboás), on the western bank of the Araguaya.
72. The Guapindagés or Guapindayás, between the Araguaya and Xingú.
73. The Javahé or Javaés, to the east of the Ilha de S. Anna in the Araguaya, and settled at the village of San Jozé de Mossamedes,—are said to be now almost extinct.
74. The Chavantes (or Xavantes), numerous; generally free, and enemies to the Brazilians. They are scattered over a great part of Goyaz and the contiguous countries. Some are settled in the Aldea de Pedro Terceiro at Caretaõ, in Goyaz.
75. Cherentes or Xerentes, also called Cherentes de Cuá (Quá), like the last, numerous and widely scattered, especially between the Araguaya and Tocantins. Their largest villages are in the plains on the east side of the Tocantins, above the mouth of the Rio Manoel Alvez Grande. They even extend from that point beyond the ridges which separate

the Tocantins from the streams running in an opposite direction.

76. The Pochetys or Puchetys, cannibals living to the north of the two last, and sometimes wandering northwards as far as the Rio Mojú.

77. The Carayás, to the west of the Araguaya, and on the island of Santa Anna (Martius, Reise, ii. 575);—formerly domiciled in the Aldea da Nova Beira, long since abandoned, and in San Jozé de Mossamedes.

78. The Cortys, a small nation between the Tocantins and Araguaya.

79. The Gés (Géz), a great nation, of which many very populous hordes and tribes are known. They occupy the territory between the Tocantins and Araguaya as far as thirty leagues south of S. Pedro d'Alcántara, and often wander as far northwards as Pará. Generally speaking, they have not yet been subdued; but a few hordes begin to hold some commerce with travellers. Their wild predatory habits render them dangerous to the settlers. Their subdivisions are:— i. Norogua-Gés; ii. Apina-Gés; iii. Canacata-Gés; iv. Mannacob-Gés; v. Poncata-Gés; vi. Païcab-Gés; vii. Aó-Gés; viii. Cricata-Gés, also called Gaviaõ (Hawk) Indians; ix. Cran-Gés.

80. The Crans, probably in former times a branch of the last, with which it is said to have nearly the same language. (Martius, Reise, ii. 822.) The Brazilians call them Timbiras (Timbiras, Embiras, or Imbiras), probably because they ornament their arms and legs with narrow bands of the inner bark (Embira) of trees. They are subdivided into the following tribes and hordes:—

A. The Timbiras da Mata (Forest Timbiras).
   i. Saccame-Crans, between the rivers Balsa and Itapicurú.

B. Timbiras de Canella fina (fine Cinnamon).
   ii. Corrume-Crans, and iii. Crurecame-Crans, in the plains between Alto Mearim, Alpercatas, and Itapicurú.

C. The Timbiras de Bocca furada (bored-mouth).
   iv. Aponegi-; v. Poni-; vi. Purecame-; vii. Paragramma-; viii. Macame-(Carawús or Caroús); ix. Sapi-; and x. Jocame-Crans.

All these tribes and hordes inhabit each bank of the Tocantins, in the northernmost part of Goyaz to the borders of the native forest (Urwaldung; in Portuguese, Mata Geral). They are said to agree in language, manners, and customs. They make hostile incursions far into the provinces of Pará and Maranyáng, (Maranhaõ).—(Franc. José Pinto in the Patriota of September, 1813, p. 61.)

81. The Tapacoás, on the eastern mountainous bank of the Tocantins.
82. The Chacriabás, or (Xicriabás), originally on the Rio Preto in the province of Pernambuco; but now about 800 strong, settled in nine aldeas (villages) in the district of Desemboque, and in single families in Duro, Mossamedes, Rio das Velhas, and Formiga (Eschwege, Brasilien, i. 93). They were probably at first a part of the same nation as the Malalís on the coast.

V. In Piauhy, Maraniáng (Maranhõ), and the interior of Bahia.

83. The Acroás (Aruás or Acruazes) at the sources of the Rio Parnahyba in Piauhy, between it, the Tocantins and the Rio das Balsas. It is divided into two hordes:
    i. Acroá-assú (Great Acroá); and ii. Acroá-miring (Little Acroá).

    The latter are still free; the former settled at Duro, Formiga, and Mossamedes in Goyaz, and at S. Gonçalo d'Amarante in Piauhy (Martius, Reise, ii. 807).
84. The Masacarás, formerly dwelling on the Rio de S. Francisco to the south of the Serra dos Dous Irmaõs (Mountains of the Two Brothers), now separately in the Mission of Joazeiro, at Villa Real de Santa Maria, at Nossa Senhora d'Assumçaõ, and at Quebrobó (Martius, Reise, ii. 741, 762).
85. The Acrayás, formerly on the Rio de S. Francisco on the western side of the province of Bahia (the Bay), now in a civilized state; but very rarely at Rio Grande, Urubú, &c. Perhaps they are the same as the Acroás.
86. The Aracujás, and 87, the Pontás, as the foregoing.
88. The Goghés, or Gheghés (Gogués, Guegués), between the southernmost parts of the Rio Parnahyba, Rio do Somno, and the Tocantins. They are domiciled at S. Gonçalo d'Amarante in Piauhy, and speak the same language as the Acroás.
89. The Jaïcos (Jahycos or Geicos), originally on the Rio Gorguea, now settled in villages at Nossa Senhora das Mercés, in Piauhy, and at the mission of Cajueiro.
90. The Pimenteiras*, between the sources of the Piauhy and the Gorguea. They are now all settled in the province of Piauhy (Martius, Reise, ii. 805).
91. The Chocós or Chucurús, originally on the Rio Pajehú, now settled in villages at Ororobá (Simbres).
92. The Garanyuns (Garanhuns), on the Rio de S. Francisco.

* Pepper or Pimento Indians: the author is not acquainted with their real name.

93. The Caïrirís (Cayrirís or Cayrís), on the Serra dos Cayrirís (Cazal, ii. 183). In part settled at Collegio.
94. The Ceococes, and 95, the Romaris, formerly inhabited the Serra do Páo d'Assucar (Sugar-wood mountains) in the province of Pernambuco; but now occupy villages at Propiha and S. Pedro on the Rio de S. Francisco (Cazal, ii. 150).
96. The Acconans, on the Lagoa comprida (Long morass), a few leagues to the west of Penedo, and settled in villages at Collegio (Cazal, ii. 182).
97. The Carapotos, on the Serra Cuminaty, and at the Parroquia do Collegio.
98. The Pannaty, on the Serra de Pannaty in the province of Rio Grande do Norte.

VI. In Pará, along the Rio das Amazonas and its confluents.

A. On the south side of the river.

99. The Bôs or Bus, called Gamellas (Bowls) by the Portuguese, with whom they live in a state of amity, are divided into two hordes or tribes :—
   i. The Acob-Bûs on the Tury-asú and Pinaré (Martius, Reise, ii. 823).
   ii. The Temem**b**-Bûs.
100. The Coyacas, a doubtful race of people on a hill between the Rio Mearim and the Guajahú (Ibid.)
101. The Ammaniús, on the Rio Mojú, between the Tury-asú and the Tocantins.
102. The Guanapús, on the Rio Guanapú. A tribe of the Bûs?
103. The Pacajás, on the Rio Pacajâz.
104. The Tacanyopés, (Tacanhopês or Taquanhopês), between the rivers Pacajâz and Guanapû, and in the territory of the Xingû (Jingú). This name is given in the Lingua geral to Indians, who wear a leaf rolled in a peculiar manner (Taconya-oba) : their real name is not known to the author. In his travels (iii. 1047), he has referred these, and the two preceding tribes, to the Tupí race ; whether correctly or not, future travellers must decide.
105. The Tacuhunos (Tacuahunas or Taguahunos), on the Rio Tacuhunos, a tributary to the Tocantins. In the Lingua geral, taguá signifies 'yellow ;' this name is, therefore, perhaps equivalent to 'Yellow-men.'
106. The Jacundás or Yacundás, between the river so called, and the Tocantins.
107. The Curiarés (Cariberís or Curiverés); 108. Juruúnas (*i. e.* Black-faced); 109. Cusarís or Cossarís ; 110. Javipujás ; and 111. Quaruaras, are all still mentioned as inha-

biting the woods between the Jingú and the Tocantins. They are partly settled in the missions of the Jesuits and Capuchines, and partly extinct. Perhaps they are also a relic of the Tupís.

112. The Tapajós or Tapajocós, on the river which takes its name from them, have now probably entirely perished (Reise, iii. 1050).

113. The Yavaings or Javains; 114. the Warapás; 115. the Tapocorás; 116. the Pirikitas; 117. the Swariranas (named perhaps from the Sawari, *i. e.* Caryocar nuciferum); 118. the Sacopés; 119. the Jacaré Tapwuja (Caïman Indians); and 120. the Wara-piranga (Red-men), of whom the three last are cannibals, all live near the Tapajôz (Martius, Reise, iii. 1053).

121. The Mundrucús or Muturicús, called by their neighbours Païghizé, *i. e.* Decapitators, live near the Tapajôz, and between it and the Rio Mauhé. For the most part free; but in part collected in the great aldeas on the Tapajôz: they already keep up an intercourse with the Whites. Do they belong to the Tupí race? (Reise, iii. 1310, 1337).

122. The Mauhés, on the Rio Mauhé and the Furo Irariá (Ibid. 1317). Their hordes are:—i. the Tatús (Armadillo-Indians); ii. the Tasiwás; iii. the Jurupari Pereira (Devil's-Indians); iv. the Mucuings (named from an insect); v. the Jubarás; vi. the Wu-tapwuyas (*i. e.* natives); vii. the Guaribas (Roaring-ape Indians); viii. the Inambús (from a bird so called); ix. the Jawareté (Ounce-Indians); x. the Saucanés; xi. the Pira-Pereïras (Fish-Indians); and xii. the Caribunas (perhaps a horde of Caribís; they are said to be monorchides).

123. The Jumas; and 124. the Parentintins, at the sources of the Rio Canumá, and from thence southwards. Single families are settled as villagers at Moura, Alvellos, Ega, &c.

125. The Pammas or Pamas; 126. the Andiras (Bat-Indians); and 127. the Araras (Ara-Indians), all inhabit the upper territory, between the Tapajôz and the Madeira.

128. The Muras, at first on the upper Madeira; at present scattered near that river, the Solimoës, and Amazons, and in many other places. They are generally migratory; but attempts have been lately made to settle them in villages on the Amazons river (Martius, Reise, iii. 1070).

129. Torá (Torazes or Turazes), formerly living with the foregoing tribe on the Madeira; but now no longer heard of on the banks of that and the neighbouring rivers.

130. The Ita-tapwuja (Stone-Indians, probably because they

wear a stone in their lower lip), on the Capaná, and other tributaries to the Madeira.

131. The Amamatys, between the Madeira, the Purús, and the Capaná.

B. On the north side of the Amazons river.

132. The Amicuanos at the sources of the Anawirapucú.

133. The Armabutós at the same place, and farther westward, now almost extinct.

134. The Tucujús on the Rio Tueré.

135. The Wayapís (Oaiapís, Uajapís) on the Jarí and its branch, the Guaratabnrú.

136. The Apamas on the Rio Parú to the west of the foregoing tribes.

137. The Aracajús at the same place. Both these tribes are domiciled at the Villa Almeirim, Alemquer, and Montalegre.

138. The Harytrahes at the sources of the Gurupatuba.

139. The Cariguanos (Cari-men, i. e. Caraïbs?) at the sources of the Rio das Trombetas.

140. The Wanibas (Uanibas or Anibas), formerly on the Rio Aniba, but said to be now quite extinct.

141. The Terecumás or (Taracum), between the Rio Uatuma and the Anavilhana.

142. The Arwakís (Aroaquís or Arüaquís, Arawacks?), called by the Portuguese Orelhudos (long-eared), between the Rio Nhamundá (Nyamundá) and the Rio Negro, settled at Serpa, Silves, Arrayolos, &c. (Martius, Reise, iii. 1080, 1114).

143. The Caripunas (Caripuras, Caribes, or Caraïbs), in several places at the sources of the tributaries to the Rio Essequebo (Essekebo) and the Amazons, between the Rio Negro and Trombetas. Caraïbs are said also to dwell near the Yuruá to the south of the Catukinas (Catuquinas).

144. The Curuaji; 145, Saré or Sará; 146, Anicoré; 147, Aponariá; 148, Tururi; 149, Juki; 150, Urupá; 151, Parakís; 152, Comanís; and 153, the Baeuna (Bacuna?), are now perhaps very feeble, or for the most part extinct hordes and tribes, formerly settled at Serpa, Saracá, and the Barra do Rio Negro (Reise, iii. 1080, 1087).

VII. In the province of the Rio Negro.

A. On the Solimoës (Solimóngs?) and its southern tributaries.

154. The Puru-purús on the lower Purú, partly having a piebald skin (Reise, iii. 1175).

155. The Irijús, and 156, the Tiarís on the Purú, or domiciled at Serpa and Alvellos.

157. The Wamanis (Uamanys or Amanys) on the upper Mamiá; formerly settled at Alvellos, now perhaps extinct.

158. The Catawijís (Catauixís, Catauaixís, or Catauxís), on the upper Purú and on the Yurwá, a numerous and warlike people, settled at Nogueira and Elga.
159. The Catukinás (Catuquinas or Catoquinos) on the Yurwá, above the foregoing tribes.
160. The Waraicús (Uaraicús or Arauicús) on the Yurwá, farther southwards than the foregoing, and settled at Fonte Boa and other places on the Solimoës.
161. The Tapajanas (Tapaxanas) on the upper Yurwá and the Jutahy.
162. The Marawás (Marauás or Marauhás) in the same place, and settled occasionally; *e. g.* at Fonte Boa.
163. The Maturwás; 164, Wacarauhás; 165, Jemiás; 166, Tokedás; 167, Chibarás; 168, Bujés; 169, Apenaris; 170, Urubús (Falcon Indians); and 171, the Canamering or Conamarés on the Jutahy; of all which tribes the Marawás, who are very fair in complexion, the Catawijís, Catokinas, and Canamering, are the most numerous.
172. The Pacunas, formerly met with at Bache Icabo, and afterwards at Fonte Boa, are now perhaps no longer extant.
173. The Sirús (Cirús) on the Solimoës, formerly settled at Nogueira, now perhaps extinct.
174. The Tamuanas, in the same state, formerly at Ega.
175. The Ambuás, ditto, formerly at Alvaraës.
176. The Momanás, ditto, at Fonte Boa.
177. The Achwaris (Achouarys or Achoarys) and Cuchi-waras, already mentioned, now perhaps hordes of the northern Tupís. They inhabited villages at Ega, Nogueira, &c. The case was the same with the Sorimoës (Solimoës) or Soriman (perhaps with the Yuremaús, or Jurimaguas, Omaguas, and Campevas), who formerly inhabited the islands in the Solimoës (see Martius, Reise, iii. 1193).
178. The Tacunas (Tecunas, Ticonas, or Tucunas) on the Jutahy, settled at Olivença, Fonte Boa, and Castro d'Avelans (Reise, iii. 1196).
179. The Culinos (Culinas or Gulinos) on the Yavary, distinguished by their round faces and large eyes (Ibid. iii. 1188). Tumbiras occur here likewise, as in Maranyáng.
180. The Curuamás, and 181, the Chimanos on the upper Yavary.
182. The Yaméos on the boundaries of Brazil, towards Mainas (see Von Murr, Reisen einiger Missionarien, p. 71).
183. The Majorunas (Maxorunas or Majironas) on the Yavary (Reise, iii. 1195).
184. The Toromonás at the sources of the Yavary.

B. Between the rivers Solimoës and Negro.

185. The Cawijanas (Cauixanas or Cayuvicenas), and 186, the Pavianas (Payanas), both on the Rio Mauapirí and the Tonantin, the first also on the lake Acunauhy, and in the territory between the Yupurá, Auati-Paraná, Içá (Isá), and Joamí. They were formerly settled at Fonte Boa (Martius, Reise, iii. 1191, 1215).

187. The Isás (Içás), and 188, the Caca-Tapwujas on the river Isá (Iça), of whom the former are already extinct. (Caca, in the Kichwa tongue, signifies mountain, and Tapwuja in the Brazilian, a native Indian; this name is therefore probably a compound from the two languages, corresponding with the Spanish phrase, Indio del monte.

The Warwe-coca (coca-men, who use the coca or ypadú powder?), formerly settled at Alvaraës, are now quite extinct.

189. The Portuguese speak of a wild nation on the Içá, whom they term Orelhudos; by the Spaniards those Indians are called Orejones, but the author was not able to learn their native name.

190. The Ekitós, on the Rio Içá.

191. The Alarwá between the Awati-Paraná, Yupurá, and Solimoës, formerly settled at Alvaraës.

192. The Jumanas (or Xumanas) on the Isá, between it, the Joamí and the Pureos. These Indians are esteemed in the aldeas, on the Solimoës, and Rio Negro, as quiet, industrious people; they are settled also at Maripí, on the Yupurá (Reise, iii. 1206). Their hordes are:—

i. Carwaná; ii. Warawamá; iii. Jocacuramá; iv. Lamárama; v. Urissamma; vi. Jajúnama; vii. Picúama; viii. Jamolapa; ix. Maliŋumá.

193. The Mariarana, between the lower Yupurá and the Rio Negro, formerly numerous in the aldeas, now almost extinct.

194. The Waïnumás, sometimes also called Waïmá, related to the two foregoing, living in freedom between the Upí, a tributary to the Isá, and the Couvinarí, which falls into the Yupurá. They call themselves Inabissana (Martius, Reise, iii. 1208.) Their hordes are:—

The i. Miriti-; ii. Pupunya-; iii. Assaï-; iv. Moïra-; v. Jawarete-; vi. Jacamí-Tapwuya. The three last are, the Forest, Ounce, and Jacamí Indians; the other three are named from three kinds of palms.

195. The Yurís (or Jurís), a nation still considerable in numbers, on the Yupurá, and between it and the Isá (Martius, Reise, iii. 1223, 1236). In the Kichwa tongue, fathers called their sons Churi (Garcilaso de la Vega, Comm. Real, I. 115). Their hordes or tribes are:—

i. Jurí-comá-; ii. Cacao-; iii. Moïra-; iv. Assaï-; v. Tucano-; vi. Curasí-, i. e. Sun; vii. Oïra-asú-(Great Bird); viii. Ubi-(Reed Palm); ix. Webitú-(Wind); x. Taboca-(Mouth-tap) Tapwuja (Indians).

196. The Passés, related to the foregoing tribes, inhabiting principally the western bank of the Rio Içá and its mouth, and settled in some places at Maripí, the Barra do Rio Negro, Fonte Boa, Olivenza, &c. (Reise, iii. 1190).

197. The Coretús on the upper Apapurís, and between it and the Mirití-Paraná, settled at Ega and other places (Reise, iii. 1222).

198. The Coërunas, on the Mirití-Paraná, a tributary to the Yupurá, and especially near the Caritajá, and in the districts to the north of S. Joaõ do Principe (Reise, iii. 1202); pretty numerous also in aldeas.

199. The Yupuás on the Totá (Thothá), an arm of the Apapurís; they are related to the Coretús (Ibid. iii. 1274).

200. The Mepurys, settled at Castanheïro, &c. between the rivers Cunicuriaú and Mariá, tributaries to the Rio Negro.

201. The Aïrinys, settled at Nossa Senhora de Nazareth, &c. in the neighbourhood of the Mepurys.

202. The Yucunas (or Jucunas) to the west of the sources of Miriti-Paraná.

203. The Miranyas (Miranhas), on the upper Yupurá, as far as the Fall of Arara-Coara, between that river and the Isá (Reise, iii. 1242). Their hordes are:—

i. The Wera-asú-(Great Bird); ii. Carapaná-(Mosquito); and iii. Muriatés-Tapwuja (Indians) at war with the others (Reise, iii. 1266).

204. The Umawas (Mauas, Umauhas, or Maguas,) on the Yupurá, beyond the Fall of Arara-Coara (Reise, iii. 1255).

205. The Macús, settled in N. S. de Nazareth, St. Antonio do Castanheiro, &c. between the rivers Tiquié (Tikyé) and Uaupé (Waupé).

206. The Jaunas, west, and 207, the Tariana, north of the foregoing.

208. The Tayassú-Tapwuja (Wild-boar Indians), between the sources of the Apapurís.

209. The Cajaruánas to the north, and 210, the Macunás to the west of those last named (Reise, iii. 1274).

211. The Aetoniás (Aethoniás) at the sources of the Apapurís.

212. The Pacas; 213, the Tracuás, and 214, the Caravatanas, inhabit the same district, without any fixed places of abode.

215. The Jeberos (Xeberos or Chibaros), in the direction of Caguan, on the plains, to the west of the Rio dos Enganos.

216. The Siroás between the sources of the Apapuiís and the Cayaïri, the western arm of the Waupé.

217. The Desanas (Deçanas), between the Guaviare and the upper Waupé.

218. The Waupés (Guaopés, Auopés, Oaiupis?) on the river of that name, formerly settled at Nogueira.

219. The Ariguanes (Arequenas, Uariquenas, or Uerequenas), to the south-east of the foregoing; also on the Wejïé (Reise, iii. 1302).

220. The Cawiarís (Cauarís or Cauyarís); 221, the Isannas (Içannas); and 222, the Manibas (Bambas or Manivas), all three on the Rio Içanna, and between it and the Ijié (Ixié), formerly not rare in places on the Rio Negro.

223. The Cocuannas, (or Cucuanas,) to the south of the Rio Içanna, settled at S. Joaquim de Coané, and at Moura.

224. The Mendós on the Wejié, and 225, the Capuenas at its sources.

C. To the north and north-east of the Rio Negro.

226. The Tarumas, (or Taruman,) formerly numerous at the mouth of the Rio Negro, now no longer heard of.

227. The Manaos, (or Manoas,) formerly numerous and powerful, especially on the Rio Padauarí, where the horde of the Ore-, or Ere-Manaos still remain. The rest have now been lost by intermixture with Whites on the Rio Negro (Reise, iii. 1129).

228. The Barés, formerly, together with the foregoing, the most powerful Indians on that river, now melted away like them.

229. The Yabaänas (Hyabahanas), between the Inabú and Maraviá, northern tributaries to the Rio Negro.

230. The Curanaos (Caranaos or Curanaú), on the river Abuará.

231. The Carajás or Carayaís.

232. The Marapitanas (Marabutenas, Marizipanas, or Marabytanas), on the boundaries of Rio Negró towards the Cassiquiari.

233. The Ujaquas (on the Isá?); a few settled in villages in the Prezídio on the Isá, and on the Rio Negro.

234. The Aïrinis (or Arihinys), to the south-east of the Marapitanas, with the four following small tribes, as yet little known: *viz.* 235. the Waïpiana; 236. the Cawasirisena; 237. the Waranacoasena (Maranacuacena), formerly settled at Carvoeiro; and 238. the Bayanahys (Bayanas or Bayanaís), formerly settled at Poyares.

239. The Parawanos (or Paravilhanos), formerly masters of the country round the lower part of the Rio Branco (White

River), now for the most part settled in villages; but in a state of independence on the Uraricoera (Reise, iii. 1302).

240. The Wabijanas; 241. Paujianas; 242. Tapicarés; 243. Ananaís; and 244. Macunís, are small migratory (flüchtige) tribes in the territory of the Rio Branco*.

Many other names also are found in Brazilian MSS.; but as they often appear to have arisen merely from errors of transcription, they have been purposely omitted here.

* In the list of the Indians of Guiana, given by M. de Humboldt (Relation Historique, iii. 173), the following names of tribes on the Rio Negro occur, which are probably, in part at least, the same as the above, but altered by the way in which the Spaniards pronounce them:—Arinavis, Berepaquinavis, Chapoanas, Cogenas, Decsanas, Daricauanas, Equinabis or Marabitanas, Guamimanases, Guasuriounes, Mayepien, Maysanas, Manisipitanas.

III.—*Notices of the Indians settled in the Interior of British Guiana.* By William Hilhouse, Esq., Surveyor, Demerara.* Communicated by Captain J. E. Alexander.

'The Indian population, within the limits traced by the river Rippanooney, may be estimated at from 15 to 20,000; of whom, the number that receive triennial presents from, and conceive themselves under the protection of our colonial government, may be about 4 or 5000. The remainder are migratory, unattached to any particular government, and removing from the Oronoque to the Brazils, Cayenne, or Surinam, as necessity or inclination may impel them. The whole force capable of bearing arms may amount to 5000; and that at the disposal of the colony 1000 able to serve, if willing.

'The different nations inhabiting within the boundary are—

1. Arawaak,	5. Macusi,
2. Accaway,	6. Paramuni,
3. Carabice,	7. Attaraya,
4. Warrow,	8. Attamacka.

'The *Arawaaks* demand our first consideration, as living in the immediate vicinity of the plantations, being the most civilized, and whose services have been the most frequently required. As we are also most familiar with them, their character will serve as a model of general approximation for all the other tribes.

* [See p. 68. l. 32. Mr. Hilhouse's book was published in 1825, but is very little known; and his statements, which are founded on a very intimate acquaintance with the people he describes, throw additional light on the subject of the preceding paper.]

'This nation can furnish about 400 men, all perfectly acquainted with the use of fire-arms, and particularly serviceable in the intersected country and swamps adjoining the plantations.— They consist of the following families, or estates :—

1. Maratakayu,
2. Queyurunto,
3. Wooneseedo,
4. Demaridy,
5. Corobahady,
6. Wurallikaddy,
7. Ebesuana,
8. Dacamocaddy,
9. Aramukunyu,
10. Baboana,
11. Kanahea, Mackoveyu,
12. Daharabetady,
13. Carabunury,
14. Nebebeetaddy,
15. Seewedey,
16. Jorobalina,
17. Haduadafunba,
18. Boerybetady,
19. Caruafuddy,
20. Bakurucaddy,
21. Euboquaddy,
22. Wakuyaddy,
23. Ehbehselio,
24. Wareerobaquady,
25. Aramkritu,
26. Kariwheete,
27. Eubotaddy.

'The cast of blood is derived from the mother, and the family genealogy is preserved with the greatest care, as a preservative from incestuous intercourse—one family not being allowed to intermarry within itself. The children of a Maratakayu father cannot, therefore, be Maratakayu; but if the mother be Queyurunto, the children are also Queyurunto, and can marry into the father's family, but not the mother's.

'Marriages are frequently contracted by the parents for their children when infants. In this case the young man is bound to assist the family of his wife till she arrives at puberty; he then takes her where he pleases, and establishes his own household. But young men and women who are free, at a more advanced age consult their inclinations without any ceremony beyond the mere permission of the parent, which is never withheld but on account of family feuds.

'Polygamy is allowed and practised by all those who have the means of maintenance for a plurality of wives. This is generally the case with the chiefs or captains, who have sometimes three or four wives. All the inconveniences common in Europe, where there are more mistresses than one in the house, are also felt here; envy and jealousy being perfectly understood by their effects in the Arawaak seraglio; and the interference of the husband, with a stout bush rope, is frequently necessary to restore tranquillity.

'The captain commands the services of the families of his different wives on emergencies; and, in return, he is required to become the principal in all feuds, and to exercise towards them all the rites of hospitality in their most extended sense. On any scarcity of provisions, or prevalence of sickness, all the branches of

the family flock to the dwelling of the chief, and live at his expense, without the least doubt of a welcome. It, therefore, frequently happens, that the chief is fairly eaten out of house and home, and his cassava field completely exhausted. In this predicament he unties his hammock, puts his family into his canoe, and starts off to pay his round of visits amongst his friends, at whose expense he lives, till his next crop of provisions coming in, enables him to return to his home.

'The visiting is a complete system, and is always made to occupy three months of the twelve. The Arawaak, therefore, in preparing his cassava fields, calculates upon provisions for his family and guests for nine months; and he is never disappointed in the hospitality of his friends for the supply of the other three.

'The Arawaaks are seldom more than five feet four inches in height, and are stout and plump in proportion, but not muscular. Their necks are short, and their ancles, hands, and feet, particularly those of the women, remarkably small. The eye slopes upwards towards the temples, and the forehead is uniformly lower than that of Europeans. This trait of physiognomy may be supposed indicative of inferiority of intellect; but the cranium is incomparably superior to that of the negro, whose powers of mind are as much inferior to those of the Indian, as are those of the latter to the powers of the European.

'Some of the castes are almost as fair as the Spaniards or Italians; whilst those who live near the sea are of a very dark brown, sometimes as dark as what is called a yellow-skinned negro. But the straight, strong, black hair, small features, and well-proportioned limbs, are peculiarities that never allow the Indian to be mistaken for the African, even if alike in colour.

'On the birth of children, the husband, in his hammock, receives the congratulations of his friends in due form; and the women of the village are particularly attentive to the wants of the mother. They are exceedingly affectionate to their children—so much so, that an Indian will bear any insult or inconvenience from his child tamely, rather than administer personal correction.

'A child is named by a pe-i-man (paje), or magician, at any age. An offering of considerable value is necessary on this occasion, as, according to the fee given to propitiate the pe-i-man, is the virtue of the incantations pronounced. An unnamed Indian is thought to be the certain victim of the first sickness or misfortune that he may encounter; accordingly, only the very poorest of them are without names. They frequently take the names of Europeans in addition to their Indian appellations, more especially when they have been in the habit of receiving obligations from them; and they frequently ask an European to name a child, by which he enjoys the privilege of making an occasional present.

'The secret of attachment between the old Dutch proprietors and the Indians, consisted in the colonists taking Indian women for their housekeepers; and of course acquiring some knowledge of their language, and becoming what were considered relations. The Indian is proud of such connexions, and though he makes it a point to tease, harass, and defraud the European usurper who has no connexion with him, yet, the moment a family compact is entered into, and the Indian is addressed in his own language, nothing can exceed his faith, attachment, and honourable conduct to his white relation. His heart opens at once, and instead of deceit, suspicion, and distrust, he becomes open and confiding. The taste of the English, however, seems to be directed in a darker channel, these ties of confidence have thus become entirely extinct, and all that the Indian now cares for, is to levy contributions on all who are simple enough to pay them.

'The Indian, having no inducement to carry on trade or commerce, cultivates, during three or four months, as much provision as is necessary for the consumption of his family during the year. The rest of his time is spent in hunting, fishing, visiting, drinking, and dancing. His life is, therefore, a life of pleasure; and it is with great unwillingness that he undertakes a superfluous degree of labour, by which he relinquishes a present enjoyment for the prospect of future provision, about which he has no care. He takes no thought for to-morrow; but this is the fault of the climate, and not of the man—as he requires no clothes, and cannot starve, so beneficent is nature to all his wants.

'The *lex talionis* is observed rigidly, and tends greatly to prevent the increase of population; but, in this respect, the influence of Europeans is productive of the happiest effect; for though an Indian will hear of no compromise from another Indian in a feud of blood, he will yet faithfully abide by the determination and award of a favourite European, and will consent to a commutation, even for the life of the dearest relative, when proposed by his "backra matty." Without this interference, the accidental death of one individual frequently entails destruction on the families of both the slayer and the slain. Most of the blood feuds originate in jealousy, and the revenge of connubial injuries, of which they are highly resentful.

'The duties of hospitality are paramount with all barbarous nations. When a stranger, and particularly an European, enters the house of an Indian, every thing is at his command. The women prepare the pepper-pot, and bake a hot cake of cassava bread; a bowl of caseri is produced (a fermented preparation from the sweet potatoe), and the head of the family strives to forestall all his wants. The young men immediately leave their hammocks to hunt and fish; every article of arms or furniture,

except the toys of the children, is at his disposal, and he is absolutely oppressed with the kindness of his welcome.

'This is exceedingly inconvenient in the sequel, because all offices of kindness are supposed to be reciprocal. When the Indian pays the white man a visit, the difference in value of his furniture and equipments causes a return in kind to be too expensive. The Indian therefore says, "When you visit me, I give you every thing I have in the world—but when I visit you, you refuse me the commonest articles of your daily expenditure."

'The Indians, therefore, though they bow to our acknowledged mental superiority, despise us for our stinginess and inhospitality; and though they give us all due credit for the virtues of the head, they say we have "no heart for any thing but money."

'They have not a community of goods,—individual property being distinctly marked amongst them; but this property is so simple, and so easily acquired, that they are perpetually borrowing and lending, without the least care about payment. And in the purchase of coorials and canoes, their most expensive articles, the buyer is frequently credited to what we should call a ridiculous extent, especially as the means seldom exist of enforcing payment.

'It is reckoned indecent in the men to caress or notice the women in public; and our practice in this respect appears to them highly contemptible. But the Arawaak, when secluded from public observation, exhibits as sincere and unreserved an affection for his domestic connexions as the more civilized of any nation; and though apt to fly into the extremes of passion, when influenced by jealousy and intemperance, he is, on the whole, a good husband and relative, and a most kind and indulgent parent.

'The Indians are considered by many deficient in personal courage. It is true, that being of small stature, and possessing little bodily strength, they are unable to cope with Europeans, or even negroes; but, in wars amongst themselves, where they are more equally matched, they display a fierce determination that despises all dangers; and their combats are always *à l'outrance*. An Indian, who is deputed to revenge a murder, will follow his enemy for years together, publicly avowing his purpose, which he will not relinquish but with life.

'Their most valuable qualities are agility, dexterity, and the intuitive tact of tracking, or discovering footsteps in the bush. Where an European can discover no indication whatever, an Indian will point out the footsteps of any number of negroes, and will state the precise day on which they have passed; and if on the same day, he will state the hour. In all pursuits of deserters, and reconnoissances of negro camps, this qualification makes them in-

dispensably necessary, as an expedition without Indian guides has little chance of success.

'The Indians manufacture bows, arrows, hammocks, baskets, canoes, coorials, and apparatus for fishing, with considerable ingenuity; but, at a certain pitch, their art is stationary, and there does not appear to have been any improvement or new idea struck out in any of these branches from time immemorial. This is the case with all barbarous nations till they begin to work the metals, which last step, by opening a new train of ideas, enlarges the field for improvement *ad infinitum*;—whereas, in works of wood, bone, or stone, all possible excellence is soon acquired, and improvement ceases.

'Their animal perceptions are astonishingly acute; and their speed in their native woods, and over the most difficult ground, far outstrips that of Europeans, few of whom can keep pace with them, even for a short distance.

'No European march could ever come into competition with the astonishingly rapid movements of the Indian regiments in the army of Bolivar. An expedition composed exclusively of Indians will go over three times the ground in the same time that can be traversed by European troops; and this superiority of locomotion renders them more than a match for double their numbers in their native wilds. They can, moreover, live comfortably where European troops must starve, and they require no commissariat. With ten pounds of cassava bread, an Indian can keep the field for three weeks or a month. His gun will be always in order, and his ammunition dry and serviceable. It is impossible to surprise him; and, with a commander who can keep pace with him, and in whom he has confidence, the Indian ranger cannot be equalled by the best troops in the known world for service in a tropical region, and under the burning sun of the line.

'*Accaways.*—The Accaways occupy the country between the rapids and the high mountains of the interior. In the Demerara river, their number is about 700, and in the Massaroony, about 1500.

'They are not superior to the Arawaaks in stature, but their skins are of a deeper red, and they are more resolute and determined in their enterprises. They are recognised, at first sight, by a large lump of arnotto, stuck upon the hair over the forehead, with which they paint themselves, both to strike terror, and as a defence from the bite of insects.

'The Accaways are quarrelsome and warlike, and capable of enduring considerable fatigue and hardship; but they are such determined republicans in principle, that it is difficult to preserve subordination amongst them, and their chiefs have less consideration out of the limits of their family connexions than the chiefs of

other tribes. As soldiers, they are thus capable of performing the most desperate enterprises; but their commander must be endowed with some most peculiar and acknowledged claim to superiority, or they will not yield the least obedience to his authority.

'The Accaways are dreaded by all the other tribes; and, wherever they settle, they clear the neighbourhood. They are the pedlars and news-carriers of the whole eastern coast; and their numbers in the interior being superior to those of all the other tribes together, they could easily subdue them, were any thing like union or subordination amongst them; but, from the want of these, they are constantly at war among themselves, and the extent to which they carry on the slave-trade keeps their numbers from increasing, so that the other tribes, under the patronage of the colonial government, still preserve their liberty.

'From their constant locomotion no accurate census can be taken of their number. It differs every year, and every month in the year, so numerous are their expeditions and emigrations to and from the Oronoque, the Brazils, and Cayenne; but, wherever they travel, they trade and fight,—and the travelling equipage of an Accaway Indian is calculated either to drive a bargain or to sack a village. They are improvident and irregular in their habits; but they calculate their interest to a nicety, and the greatest number of Accaways will always be found where they are best paid and most encouraged.

'Being as hospitable as they are quarrelsome, an Accaway village is always on the alert to receive properly either a friend or enemy; and, as the sudden and frequent visits of the numbers that are constantly travelling demand an extraordinary supply of provisions, their cultivation is double that of the other tribes.

'If any period of general truce is allowed among them, it is during the dry season, in which they prepare and plant their numerous and extensive fields of cassava. But no sooner have they provided a supply for all goers and comers during the ensuing year, than they set to work manufacturing warlike implements of all kinds; and if, by the sale of a few articles, they can muster a cargo of European goods, and a few fire-arms, they set off to the Spanish or Portuguese frontier to barter them for dogs, hammocks, &c.

'In these expeditions several families join, as in the caravans of Asia, their only care being to supply themselves with a good stock of bread; they then march for three days, and halt for two, during which they hunt and barbacot their game, and are in no distress for provisions, for even two or three months, which is frequently the duration of their journies.

'In these marches when they approach a village, it signifies not

of what nation, they prepare to attack it. If it is on the alert and strong enough to resist, they conclude a treaty of commerce, eat together, and trade without reserve or suspicion; but if the place be weak and the inhabitants off their guard, those who resist are instantly massacred, and the remainder become slaves to the victors.

'Their audacity in these predatory excursions is astonishing. If a party can muster eight or ten stand of fire-arms, it will fight its way through all the mountain tribes, though at open war with them; and, by the rapidity of their marches and nightly enterprises, which they call Kanaima, they conceal the weakness of their numbers, and carry terror before them.

'On their return from a successful expedition, they prepare for a general and tremendous drinking-match. For several days prior to this feast, all the women in the vicinity are assembled. They sit round a fire, on which the cakes of cassava, made about three-fourths of an inch thick, are baked till they are brown throughout. Each woman, then moistening her mouth with a little water, chews a piece of bread till it is perfectly saturated with saliva; she then strains it in her mouth and spits out the moisture into a vessel in the centre. When a sufficient quantity of this extract,—which is called piworry,—is accumulated, water is added, and it is thrown into a hollow tree, or coorial, cleaned out for the purpose, which contains two or three hundred gallons. There it is left to ferment; and as soon as it begins to get sour, the guests assemble, and for two or three days continue to drink, till the whole supply is exhausted.

'These orgies are common to all the Indian nations, and seem to be their besetting sin, since numerous feuds and fatal consequences frequently ensue, from affronts given or received in these parties; and it is not improbable that the character the Accaways have for frequent quarrelling may originate in the greater excess to which they indulge in these feasts beyond the other nations, who are more moderate in their débauches.

'The piworry is very diuretic, and, notwithstanding the insensible state of inebriety, brought on by the enormous quantities of it which they imbibe at a sitting, few inconveniences result from it as to health. Now and then a slight fever occurs from exposure to the night air, with the damp earth for a bed; but its ill effects bear no comparison with those resulting from the use of rum.

'The Indian women, by frequently chewing the piworry, contract a scorbutic redness in their gums. They are frequently annoyed with the tooth-ache, and soon lose their teeth.

'Throughout all the tribes of Guiana, however differing in habits or language, the devotion to piworry is universal, and its mode of manufacture the same. It fills the cup of welcome on

the arrival of the stranger, and is the pledge of good wishes on his departure; and though an European stomach may rebel against the mode of its preparation, the rejection of it will, undoubtedly, be resented as an insult to the house and person of the host.

'During the dry season, the chiefs, or heads of families, exercise more authority than at other periods. The security of a supply of ground provisions for the ensuing year is a point in which all are concerned, and to this all are bound to contribute to their utmost. The chief, therefore, calls his young men around him, and, selecting a fertile spot, proceeds with axes and cutlasses to fell the trees with which it is covered, which are left to dry as they fall, and in six or eight weeks they are collected into heaps and burnt. The ashes, forming a strong manure, are mixed up with the soil, and cassava being planted, in nine months the roots are ripe for use. A succession of fields are necessary to keep up the supply during the year; and two crops are all that can be expected from the same field. One Indian will clear and, with his wife, plant two or three acres in as many weeks; and seven or eight acres will supply them with a year's food; so that ten or twelve weeks in the year is absolutely all that is required for actual labour, and the rest of the time remains for pleasure, hunting, and fishing.

'Those who are lazy or absent upon these occasions receive most severe chastisement, or are driven out of the village; and as their natural impatience of restraint often provokes the culprit to an insolent retort when reprimanded, the punishment, which is uniformly inflicted with the moussy or club, is not unfrequently fatal. At other times, this stretch of authority on the part of the chief would unite all hands against him; but here they support him from the urgency of the occasion, and his harshness is not resented.

'The Accaways are most determined humorists; and familiarly address each other by nicknames. They do not either see an European twice without affixing to him an epithet mortifying to his personal vanity. Rank and title have no influence with them in waiving this custom; and even a governor or protector has no benefit from his station, being only made to appear more conspicuously ridiculous.

'This is very annoying to individuals in authority over them; but it is meant as a trial of temper; and, if it is passed over, or merely laughed at, they yield in return a most prompt obedience, and an alacrity in the execution of the duties required of them unknown to the other tribes. In fact, the Accaways are more difficult to command by strangers than the others; but if they see that you will not be put out of humour, or lose your self-possession, they will soon evince an affection and devotion, in-

creasing as they become better acquainted with the object of it, and yielding to no instances of European fidelity. The first impression is with them indelible; and if it be unfavourable, no conciliatory attempt or after efforts can efface it. An Accaway, if once a friend is always a friend; but if in enmity with you he can never be reconciled.

'With indifferent persons, the Accaways are very Jews at a bargain; but they will sell to a favourite for one-half what they demand of a stranger; and they seldom pay debts till they are forced to do it.

'They manufacture the woraly poison, which they use in shooting feathered game, by means of the woody fibre of the centre of the leaf of the palm. This is blown through a long tube of ten feet, which is also a kind of small palm, hollowed for the purpose, and lined with a smooth hollow reed;—this is called a *sody*. The woraly, as generally prepared, has little effect upon the larger animals; but the Macusi woraly is sufficiently strong to destroy large animals, and even man.

'After witnessing various methods of preparation, I am inclined to think that the vegetable extract is merely the medium through which the poison is conveyed, the common woraly owing its poisonous quality to the infusion of the large ants, called muneery, and the stronger kind from the fangs of venomous reptiles, particularly the *couni couchi*, which is the most venomous of known snakes.

'The muneery gives the Indians, by its bite, a fever of twelve hours, with the most excruciating pain; and a decoction of two or three hundred of these may well be supposed capable of depriving small animals of life.

'The Accaways have not that open and determined deportment which characterises the Caribisce; but they are, undoubtedly, superior in courage to all the other nations; and their great numbers, and constant communication with the interior, render them the most valuable of all the Indians within the colonial boundaries. Their numbers can be increased at will by holding out proper inducements; but at this day they are dissatisfied and discontented, and of course daily decreasing.

'*Caribisce.*—The Caribisce occupy the upper part of the rivers Essequebo and Coioony, being at the extreme verge of the colony, whither they retreated on the first settlement of the Dutch in the lower Essequibo.

'The Caribisce are the most brave, credulous, simple, obstinate, and open in their resentments of all the Indian nations. Their opinion once formed is never modified by circumstances; and that kind of prudence, denominated policy, is unknown to them. They are, in consequence, rapidly decreasing; and though, about

twenty years ago, they could muster nearly a thousand fighting men, at this moment it would be difficult to collect fifty in the whole country below the falls.

'Those that remain have retired so far into the interior that their services are entirely lost to us; but they still preserve a strong attachment to the colony, and a very slight manifestation of kindness would soon induce them to return.

'The Caribisce differ materially from the Accaways, in that they never go to war for the purposes of traffic, or procuring slaves. Their disputes are either on account of personal affronts or infringement of territory, and their wars are always wars of extermination. On the Portuguese frontier they do sometimes make prisoners and sell them; but near us never, as the purchase is prohibited.

'The Caribisce have some slight tradition of their having once occupied the Caribbean islands. This is not unlikely, as the names of many rivers, points, islands, &c., both in Trinidad and the Leeward Islands, are decidedly Caribisce. It may not be improbable that the difference in character of the Caribisce, and the Accaways of the present day, may originate in the former occupation of the islands by the one, and of the continent by the other, their language being nearly identical, and the Caribisce only distinguished by that independent boldness which characterises all islanders when compared with the inhabitants of neighbouring continents.

'The houses of the Caribisce are constructed of two rows of elastic rods, about twenty feet long, stuck firmly in the ground, and bent over at top into the shape of a pointed arch; the base is about twenty feet, and the whole is covered with the leaves of the palm, laid horizontally from bottom to top. The houses of the Accaways are built either square, like those of the Arawaaks, or conical, like a bell tent. These last are called weemuh, and are very close and warm, being also thatched from the ground to the top, without any aperture for the smoke to escape by but through the door-way. The weemuh are also used by the Macusi and several inland tribes.

'The Caribisce are very indiscriminate in the use of animal food. Nothing comes amiss to them. Tigers, cats, rats, frogs, toads, lizards, and insects, are equally welcome with fish and game. If they show any predilection, it is in favour of fish.

'This they catch by stopping creeks at high water, and infusing the hai-arry, or the genami, in the shallows, the intoxicating qualities of which cause the fish to rise and float insensible on the surface.

'They also shoot them with arrows, as they seek their food on the banks of the river; and this method is peculiar during the

rainy season, as then all kinds of seeds and fruits fall in the water from the trees on the margin, and the fish crowd to the sides to devour them.

'In the dry season the fish leave the sides, and are only caught with hook and line in the deeps, except at the falls, where they are shot as they pass and repass.

'*Warows.*—The Warows, inhabiting the Pomeroon coast from Morocco Creek to the Oronoque, are a nation of boat-builders. They are about seven hundred in number, and derive considerable emolument from the sale of their canoes and coorials.

'It is most extraordinary that a maritime nation like ours should, up to this time, have paid no attention whatever to the peculiar and appropriate qualifications of the Warows.

'The mora furnishes excellent crooked timber of any dimensions, and the silvabally is, beyond all known woods, incomparable for planking ships' bottoms, being almost impervious to the worm, light, and easily worked. With such materials and such workmen as a little instruction would make the Warows, a dock-yard might be established in Pomeroon adequate to the repairs of all our cruisers in these seas, and at a comparatively trifling expense.

'The large canoes and coorials made by the Warows have been known to carry a hundred men, and a three-pounder. They are constructed on the best model for speed, elegance, and safety, without line or compass, and without the least knowledge of hydrostatics;—they have neither joint nor seam, plug nor nail, and are an extraordinary specimen of untaught natural skill. They are almost exclusively monopolized by the Spaniards, who do not scruple to take them by force wherever they find them, at their own price, though made within the British boundary. They fit them out as launches, and in this state they are admirably adapted for privateering, and even piracy. This practice ought, certainly, to be prevented, as it is both our interest and duty to protect the property of the Warows within our territory, and the craft itself is highly useful for colonial purposes.'

'Of late years the Warows have suffered dreadfully from measles and small-pox, which last has been owing entirely to the neglect of their protectors in not spreading the *vaccine virus* at a time when the other tribes were saved by the inoculation.

'The Warows frequently hire themselves as sailors in the colonial craft; and, in the Oronoque, they compose the majority of the crews of the feluccas and launches. They speedily acquire a practical knowledge of navigation; and, being expert fishermen, soon become good sailors, but are ill adapted for land service.

'They are drunken, quarrelsome, and insubordinate,—have little honour in their dealings, and little taste for agriculture, their food being principally fish, of which they will devour, at a meal,

sufficient for three moderate Europeans. They have no national or personal pride, and will ally themselves indiscriminately to whites, negroes, or mulattos.

'They would become rich from their trade in coorials, but their gluttony and intemperance soon dissipate the gains of their industry. One month they will be seen gaily dressed, and elevated with good living; and the next they will be starving, and working harder than any slaves, in building craft, for a fresh supply. This improvidence, however inconvenient to themselves, is, nevertheless, capable of being turned to good account by an intelligent government, and becomes an unceasing spur to their industry.

'The climate being peculiarly sultry on their closely-wooded coast, is also particularly infested with mosquitoes. To remedy these inconveniences they smear themselves profusely with the oil of the carapa, and this renders their skins so dark that, but for their hair, they might be mistaken frequently for yellow-skinned negroes.

'Their want of faith is so proverbial, that if they solicit a loan it is better either to give it as a present or refuse it altogether, since, if an Indian becomes your debtor, it is ten to one if you ever see either him or his loan again, at least till he thinks you have forgotten it. This observation applies more or less to all the tribes, some of whom want self-denial sufficient to appropriate means for the payment of their debts; whilst others, in regard to the whites, think it right to get all they can from them by any means.

'The eta-tree, (mauritia,) is the great support of the Warows. The fruit tastes like cheese, and is eaten with the pith, manufactured into a kind of cake of the consistency of sago. The young leaf is woven into hammocks, ropes, and baskets. The old leaf thatches the house. The trunk, split up, encloses it, and makes the floor. The pith of the large arm of the leaf, split longitudinally, makes a sail for the coorial; and, by raising the fibres of the arm, and placing a bridge under, they make a rude kind of viol, to the music of which they dance.

'They barbacot and salt great quantities of the querryman, (*genus mugil,*) with which they traffic on the coast, and sometimes as far as Demerara. Among all the tribes of Indians the virtues of pyroligneous acid have been known from time immemorial. There being many kinds of meat that will not imbibe salt with sufficient rapidity in this climate to prevent speedy putrefaction, they prepare a stage, under which they make a clear wood fire, and laying fish, flesh, or fowl upon the stage, twelve hours' smoking will preserve it for several weeks. This is called "barbacoting."

'The Warows, though deficient in the requisite qualifications

for service by land are yet equally valuable with the other nations, as they occupy a tract of land otherwise uninhabitable, and thus form a barrier to the emigration of fugitives westward. In their present neglected state their point of peculiar excellence is overlooked, and of no advantage to us; but there is no doubt that, at some future day, we shall find it necessary to husband them with our other neglected resources, and the benefit to be derived from so doing is manifest.

'*The Macusi.*—These Indians are so little known that we have few opportunities of tracing their affinity with the others; but, if peculiar misery and misfortune are claims to particular commiseration, they have long possessed them.

'Whatever tribes go to war, the Macusi are sure to be sufferers; and the most general accommodation of differences is at their expense, the rivals agreeing to join in a kidnapping expedition for Macusi slaves.

'In Demerara they are, in consequence, nearly extinct, and their remains have retreated to some of those unfrequented tracts of the interior, where the difficulty of procuring subsistence is their principal protection from invading enemies.

'They are timid, taciturn, obedient, and tolerably industrious; but they are deficient in stature and personal strength, being of a yellower cast than the Accaways, wh m otherwise they somewhat resemble.

'Having little courage, they resort to artifice in self-defence, and have the general character of poisoners and assassins. It is, however, a question whether these latter propensities are not exaggerated by the other tribes, to serve as an excuse for the general warfare which is waged against them, almost all the tribes possessing numbers of Macusi slaves, and the Accaways trafficking in them to a considerable extent with the Portuguese.

'*Paramuni—Attaraya—Attamacka.*—These three nations are too far in the interior to be of any service to the colony. They may be called mountaineers, and have all the propensities peculiar to highlanders, being always at war, or engaged in predatory expeditions.

'All the information we possess concerning them is derived from the Accaways, who sometimes purchase their slaves; but they are described by them to be warlike and ferocious, and determined against the admission of any white person into their country. However true this may be, it is certain that no European has ventured yet beyond their boundary; and even the accounts given of them by the fathers of the mission are founded on report alone. It is remarkable that these Indians, who are, undoubtedly, the most likely to incur the charge, have never been suspected or accused by the other nations of cannibalism; nor

have I, in all my transactions with the different tribes, ever met with any trace or fact to justify such a supposition. It is true the Caribisce make flutes of the thigh-bones of their enemies, but they abhor the idea of either eating their flesh or drinking their blood, and this abhorrence is general.

‘ *Soil, Climate, Topographical Remarks, and Facilities for Colonization.*—The climate of the region inhabited by the Indians is much more salubrious than that of the coast. Though approaching nearer to the line, its superior elevation causes a decrease of temperature, and the surface of the earth is always kept cool, from the thick shade of the forest with which it is universally covered.

‘ It is a common observation, that the air of the rivers is unhealthy; but this only applies to that part of them which runs through the swamp land and level of the sea-coast;—here the exhalations and vapours accumulate, and the sea-breeze is not sufficiently constant or powerful to dissipate them. Throughout the whole extent of the salt or brackish water, fever and ague predominate; but, beyond the influx of the tide, the banks of the rivers are so proverbially healthy, that were the population ten times more numerous than it is, there would be little employment for a physician.

‘ As we approach the high sand hills of the interior, the natural drainage is so perfect, and the torrent of fresh water supplied by the creeks forms so strong a current, that all impurities are quickly drained from the valleys, and the surface water is instantly absorbed by the sands.

‘ The water of those creeks that are uniformly shaded from the sun is about five degrees colder than that of the river.

‘ The breadth of the river, by exposing a great surface to the influence of the sun, causes its increased temperature. During the night, therefore, which is seven or eight degrees cooler than the day, the water of the river becomes comparatively a warm bath; and the time of its lowest comparative temperature is about noon, when the heat of the air is greatest, and the river has not yet recovered the heat it lost during the night.

‘ Bathing, therefore, in the heat of the day, is more bracing to the system; but bathing in the morning is most congenial to the feelings, as there is scarcely any difference between the temperature of the air and the water for two hours after sunrise.

‘ The evaporation in the neighbourhood of the line being supposed ten times greater than near the poles, the rains are in proportion much more heavy and frequent. But in these regions vegetation would cease were the supply of moisture only equal to that of temperate climates; and, upon the hills, where the water runs off more rapidly, a greater quantity of rain is required than

in the valleys, where it stagnates, and is absorbed in superior proportion by the earth.

'We accordingly find, that upon the hills of the interior the clouds discharge three times as much rain as falls upon the coast, and without causing any inconvenience.

'This disproportion between the rains of the coast and the interior would not be so great but from the circumstance of the vast tract of low land from which the forest has been cleared for cultivation. Woody countries are always the most humid; and, in a plain without trees, the clouds will pass over without discharging any rain, from the want of points of attraction.

'The importance of this fact has not hitherto met with sufficient consideration. A plain in the tropics, without rain to moisten it, soon becomes a sterile desert; and nothing will attract the electricity of the clouds, and cause them to burst, but the intervention of groups or rows of tall trees.

'It is a point, therefore, worthy the consideration of our colonial legislature, to preserve a portion of bush standing on the coast for the attraction of the rains, or to oblige the different estates to plant tall fruit or forest trees on their side-lines; as there is no doubt that the more the country is cleared of bush, the drier and the less fertile it becomes, and this more particularly with regard to the sugar cultivation.

'In the interior, the direction of the winds is by no means so uniform as on the coast. From the month of April to July, they blow more from the south than from any other point; and these land-winds, which occur at intervals throughout the year, by impeding the course of the clouds, as they are propelled by the sea-breeze, are another cause of the increased rains.

'From the superior salubrity of the climate, and the simple habits of the Indians, it is reasonable to suppose, that prior to the introduction of rum they enjoyed great longevity. The native intoxicating beverages are so mild and diuretic, that little inconvenience results from their excesses in them; but their system of computation is so defective, that they can neither calculate their own age nor those of their offspring.

'Early puberty is common in all hot latitudes; but it does not seem to shorten the period of existence, though the appearance of age comes on sooner. The Indian girls are marriageable at twelve or thirteen, and the boys at fifteen or sixteen; at twenty-five years the women lose all the appearance of youth; but the men at forty are not older in appearance than Europeans of the same age.

'Upon the whole, there is no doubt, that if the hand of cultivation reached to the hills of the interior, and a few artificial

improvements were added to the advantages of local situation, the climate of the Indians would be the most healthy and agreeable of any within the tropics, with fish, flesh, fowl, and vegetables in abundance, pure water, no fevers, and no mosquitoes.

'The geology of Demerara is very simple, and soon described. —The Warow land of Pomeroon, and the coast lands of the whole colony, are principally composed of an alluvial blue clay, intermixed with narrow strata of sand; and, on the Mahaica coast, with sand and shell reefs. This tract is most particularly adapted to the cultivation of sugar, cotton, and plantains, to which it is mainly devoted; nor does there exist in the known world a soil possessed of such amazing richness and fertility. It is never manured, though an acre has been known to produce upwards of 6000 lbs. of sugar, or 20,000 lbs. of the farinaceous food, the plaintains, in a year.

'As we go deeper into the interior, the clay loses its blue tinge, and gradually becomes yellow; at this stage it is always covered with a stratum of vegetable residuum, called *pegas*, which is the half-decayed vegetable mould from dead grass and leaves, and is, in many places, several feet deep, forming a great impediment to cultivation. Plantains do not thrive in this land, but it is peculiarly favourable to the growth of coffee, for which it is principally cultivated; and the returns are ample, and of superior quality.

'Behind the pegas lands come high ridges of sand, interspersed with valleys, in which is a slight admixture of clay. These sand-reefs present many fertile spots for the cultivation of coffee, cocoa, arnotto, fruits, and ground provisions of all kinds; and, extending in their direction parallel with the sea-coast, are occupied exclusively by the Arawaak nation.

'To the south of this belt the rocky region commences, consisting of elevated ridges and detached conical hills, resting on bases of sand-stone, granite, and siliceous crystal, containing a great variety of ochres and iron ores, mica, prismatic, hexagonal crystals, and, in some instances, slight indications of the precious metals.

'Though it is probable that gold and silver exist in the primitive mountains of the northern, as in those of the western coast, yet no native specimens have ever been produced by the Indians within our territory. Two or three attempts at mining were made by the Dutch on their first settlement in Essequibo, but the ore was not found worth the expense of working. The most probable site of the precious metals is in the mountains of the Attaraya and Attamacka nations, and these are beyond our reach.

'The rocky region is possessed by the Accaways and Caribisce, interspersed with small settlements of Macusi and Paramuna;

but these latter are principally found in the debatable land at the foot of the mountains, where they become the alternate victims both of the coast tribes and the mountaineers.

'*Superstitions.*—The Indians acknowledge the existence of a superior divinity, the universal Creator; and most tribes, also, believe in a subservient power, whose particular province is the protection of their nation. Amongst the Arawaaks, Aluberi is the supreme being, and Kururumanny the god or patron of the Arawaak nation.

'Woorecaddo and Emehsewaddo are the wives of Kururumanny, one signifying a worker in darkness, and the other the couchy, or large red ant, that burrows in the earth; together, they are typical of the creation of all things out of the earth in the dark.

'The Caribisce and Accaways call their god Maconaima, also signifying one that works in the dark. Their idea of the creation is, that coeval with Maconaima was a large tree, and that having mounted this tree, with a stone axe he cut pieces of wood, which, by throwing into the river, became animated beings. The details of this tradition are nearly as absurd and obscene as the mythology of the Hindus; they are, however, sufficiently indicative of the acknowledgment of a supreme being. The Indians have, undoubtedly, a religious principle among them; but as they have no priesthood, and no form of worship, it degenerates, as with all ignorant minds, into superstition and a belief in magic.

'The evil spirit is believed to be the author of all the miseries that afflict humanity; every idea of terror is attached to this power of darkness; and the pe-i-man, who claims the power of exorcism, is regarded with the greatest consequent reverence and respect. All attempts, therefore, at conversion must be utterly futile, except the pe-i-man himself be made an interested party. In the present circumstances he derives all his power and authority from the conviction of his supernatural agency; and he moreover derives all his subsistence from the contributions levied on the credulity of the ignorant.

'*Language.*—There is no South American topic on which exists such general ignorance as the language of the Indian nations to the east of the Andes.

'The Spanish fathers, far from possessing the zeal which led an English missionary to boast of his skill in twenty-seven different negro languages, do not appear to have taken the least trouble in teaching their doctrines in the native tongues of their audience;*

* [This, like all such sweeping censures, is not consistent with either truth or justice. Grammars and vocabularies of several of the South American languages were compiled by Spanish and Portuguese missionaries, as may be seen on reference to 'Adelung's Mithridates,' 'Humboldt's Travels,' or 'Southey's Brazil.']

as an excuse for which, they have joined in declaring that the language of the Indians is poor, deficient in compass, strength, or power of description; including in this denunciation dialects and languages of the most opposite construction. Yet when we consider that the enormous number of objects in every branch of natural history within the tropics, constitute of themselves a most extensive vocabulary of nouns, and that these have all their peculiar and appropriate Indian titles, whereas, in Europe, we have borrowed from all languages, epithets that were wanting for their description in our own, it is evident, that in this department of language, they cannot be accused of poverty of expression.

'The Indians being such admirable naturalists, it is reasonable to suppose that the extent of power in their language in this particular should influence the other component parts; and if we are in want of positive proof on the subject, we have, at least, every reason to believe it probable that the above circumstance, and the luxuriance of their climate, would rather, as in the east, make their language copious, figurative, and harmonious.

'It is by no means unreasonable to suppose that the amazing difference and variety of languages and dialects is, in itself, indicative of variety and power in the individual tongues of each nation; and we are particularly struck with the extraordinary dissimilarity of the Mexican and Peruvian to the languages of Guiana and the eastern shores.

'After all the theories that have been adopted to account for the origin of the population of America, none have yet been founded upon that most natural of all bases—the analogy of language. No one, on comparing the language of the United States of America with that of England, could err for an instant in deducing the source of their population; and it must be evident, upon this principle, that in the absence of all tradition among the Indians, if we are indeed to seek a parent stock in the other hemisphere, the only approximation by which we can be directed is that of language.

'Peculiarities of local circumstances will act upon manners, habits, and even forms and features, causing many marked distinctions and variations from the original. In the deserts and immense plains of Asia, the Arab and Tartar are wandering shepherds, because they have no means of subsistence but from their flocks, and the earth does not repay the labour of cultivation; but place the same Tartar in the forests of Guiana, where he has little pasturage, but plenty of game, and the soil is fruitful with little labour, he becomes, from alteration of local circumstances, a hunter and partial cultivator. Still, though his habits are changed, his language remains unaltered through ages, and distinctly indicative of the

stock from whence he sprung, and the land from whence he emigrated; and in this point of view the population of America presents some peculiarities which render the supposition of a common origin quite inadmissible.

'The Indians of the northern states speak different dialects from either Mexicans, Peruvians, or those of Guiana. They sleep squat on the ground, wrapt in skins; they drink a beverage of fermented maize—they scalp and torture prisoners—they put their youth to a severe probation—and they have no slave-trade or tradition of empire.

'The Indians of Peru and Mexico have formed great monarchies; their language differs in the greatest possible degree from those of all the other nations; they have long known and worked the precious metals; and their almanacs and hieroglyphics are indicative of the superior abilities attendant on a state of society, compared to the insulated independence of mere hunters and fishermen. They have also a regular system of religion.

'The Indians of Guiana, differing again from all these, have no propensities in common with any of them.

'Their language evidently approximates more to the dialects of eastern Asia; they sleep in hammocks of uniform construction, though made of different materials; they have never been collected into any thing like a sovereignty; but they carry on the slave-trade extensively. Their general beverage is from the cassava (the piworry), and they have no form of religious worship.

'These material discrepancies point out three distinct roots, without any reference to the almost unknown tribes of the south, the Patagonians.

'It undoubtedly requires considerable time, industry, and perseverance, to become so well acquainted with unwritten languages as to demonstrate their eligibilities or comparative excellencies. The following vocabularies are not inserted with any presumption of this kind, but for the purpose of ascertaining by the comparison with the oriental languages of Europe and Asia, whether we have sufficient grounds to suppose the Indians of Tatar origin, to which we are naturally inclined to accede, from the similarity of stature, colour, features, and particularly the direction of the eye-lids.

Vocabulary of Eighty-two Nouns and Numerals in the Four Indian Languages of British Guiana.

*** Where the Accaway and Caribisce are exactly the same, one is omitted. The vowels have mostly the broad accent.

	English.	*Arawaak.*	*Accaway.*	*Caribisce.*	*Warow.*
1.	Man	Wadeely	Weenow	,,	Neebooroo.
2.	Woman	Hearoo	Ebooetey	Woorey	Teeda.
3.	Boy	Elunchy	Weeuofutoonoh	Meh	Noboto.
4.	Girl	Headaaza	Yemooricoh	Yemooroh	Annebacka.
5.	Old man	Habettoo	Tompoco	,,	Edamoo.
6.	Old woman	Daaca Tay	Wabotorey	Peepeh	Natweet.
7.	Brother	Dalookeytchey	Sayowa	Seewoh	Daheyey.
8.	Sister	Dayoodaata	Yeynootey	Wahwah	Daakooey.
9.	Uncle	Daduyinchy	Yaaooh	Yaawooh	Daatoo.
10.	Aunt	Daarey	Waapoh	,,	Daakatey.
11.	Cousin	Daooenchy	Baatomoh	,,	Hesenga.
12.	Grandfather	Dadookootchy	Taamoh	Taamcoh	Nobo.
13.	Grandmother	Daacootuh	Peepeh	,,	Naatu.
14.	Grandchild	Daalekenchy	Eupaarey	,,	Naatoosenga.
15.	Head	Daaseye	Eupopo	Euboobah	Maquaw.
16.	Neck	Daanooroo	Yewasacorooey	Yenasally	Mahaabey.
17.	Eyes	Daacousy	Yenooroo	,,	Maamu.
18.	Nose	Dasery	Yenatarry	,,	Mayhecaddy.
19.	Mouth	Daleeroko	Eubotarry	Endarry	Maroho.
20.	Hair	Dabarra	Eyunsettey	Eusetty	Maaheo.
21.	Ears	Dadeehy	Paanarrey	,,	Mahohoko.
22.	Arms	Daadenaina	Yaboorey	,,	Mahuara.
23.	Hands	Daacabboo	Yeynarroo	Yenarry	Maamuhoo.
24.	Fingers	,,	Yeynaroo-seateireh	Yenarry eteedeh	Mamuhoo.
25.	Bones	Daaboonah	Yephoh	,,	Moohu.
26.	Skin	Daada	Eupeehpoh	,,	Mahoro.
27.	Flesh	Daseeroquaw	Paacah	Eubonoh	Matoomuh.
28.	Back	Dahaborooh	Yaabooh	Enganarry	Maahuh.
29.	Belly	Daadeybayou	Youemboo	Euenboh	Moboonuh.
30.	Breast	Dalonaaebou	Epopooruh	Epoboroh	Maameyhoo.
31.	Thighs	Dabookeesa	Eupatooh	Eupeeteh	Marolo.
32.	Legs	Dadaanah	Eusairuh	Euseedeh	Maahah.
33.	Feet	Daacooty	Euboboornh	Poboorоh	Moomoo.
34.	Blood	Cooreesa	Mooenooroh	,,	Hotuh.
35.	Fire	Ikhe kee	Waatuh	,,	Ikkoonuh.
36.	Wind / Air	Awadooley	Pepeytoh	,,	Ahaaka.
37.	Water	Wunney-yabbo	Toonah	Tooniah	Ho.
38.	Earth	Ororoo	Eetoh	,,	Hotah.
39.	Sky	Ooraroo / Casaako	Caabeh	,,	Nahaamootuh.
40.	Bow	Semaara-haaba	Ooreybah	,,	Ataboroo.
41.	Arrow	Semaara	Poolewah		Ataboo.
42.	Bowstring	S. h. Teemy	Labarey omooteh	Ocreybah amooteh	A. Ahootuh.
43.	Hammock	Daacorah	Eubaatey	,,	Hah.
44.	House	Baacheh	Yeowteh	,,	Hanooko.
45.	Corial	Coriaal	Cooriaala	,,	Wayeybacka.
46.	Paddle	Nahaaley	Abagoeta	,,	Haaheh.
47.	Buck-pot	Dawadda	Toomayeng	Toomaany	Hahluh.
48.	Knife	Eadawalla	Mareea	,,	Daabo.
49.	Hook	Bodeyhey	Kehweey	Kuhweh	Osceebokay.
50.	Calabash	Eweedah	Quahey	,,	Matalu.
51.	Club	Moossy	Eubodooroh	Pooduh	Dooseh.
52.	Beads	Coraara	Casooroh	,,	Naascey.
53.	Cloth	Caremarry	Tebooroh	Cameesa	Heakaarah.
54.	Sugar	Secaruco	Asekara	,,	Secaramutuh.
55.	Salt	Pamoo	Waaeyu	,,	Bam.
56.	Pepper	Haatchey	Pooeymuy	Poomeh	Hooka.
57.	Gun	Aracaboosa	Arakoobsa	,,	,,
58.	Powder	Culbara	Culbara	,,	Henehbwah.
59.	Shot	Bala	Peeroto	Beerotoh	A. Ayau.
60.	Tobacco	Yeury	Taamooy	Taamuh	Aoha.
61.	Sun	Hadalley	Weeyeyu	,,	Yah.
62.	Moon	Kaatchey	Noonoh	,,	Waanehuh
63.	Stars	Weewah	Eeremah	Seereguh	Keorah.
64.	Rain	Wunney	Konobo	,,	Naabaa.
65.	Wind	Awadooley	Pepeytoh	Beybeytuh	Ahaaka.
66.	Thunder	Acoollia cally	Gonomaru	,,	Nahaa.

English.	Arawaak.	Accaway.	Caribisce.	Warow.
67. Lightning	Beylebeleero	Cabeyta	„	Abeylebeyleh.
68. Hills	Ororoo-Ayumuntuh.	Wooeybooey	Wooboh	Hotaquay.
69. Woods	Konoko	Eetoh	„	Daunah.
70. Rocks	Seeba	Toeboh	„	Hoeyu.
71. Sand	Murtooko	Sacow	„	Kahemrah.
72. Islands	Kal-eery.	Paah-oh	Paahuh	Bulohoh.
1—One	Abaaru	Tegeenah	„	Hesacha.
2—Two	Beama	Asagreh	„	Monamu.
3—Three	Caboola	Osorwoh	„	Deeanamu.
4—Four	Bee-y-beech	Asagreyney	„	Munebee-nahatakanuh.
5—Five	Aba-dacabbo	Tegeneh seh.	„	Mahabass.
6—Six	Aba temainy	Meah daroy	„	Mohomatuna-hesecka
7—Seven	Beama temainy	Yacombeh	„	——— Manam.
8—Eight	Caboola temain	Tosorwa-nobeh	„	——— Deeanamu.
9—Nine	Beeybeech temain	Yecombeh-nelly	„	——— Nahatakanuh.
10—Ten	Beama dacabbo	Yuma-cawuh	„	Mooreycooyt.

THE LORD'S PRAYER IN ARAWAAK.

Kururumanny—haamary caleery oborandy—bachooty deweet boossa—baynse parocan, bayin so pareeka—yahaboo ororoo adiako—meherachehbeyn dacotooniah—Ebehey nebehedow wakayany odomay—Mayera toonebah dayensey—Boboro talidey.—*Hedquainey.*

'A grammatical analysis is impracticable from the present limited knowledge of the author; but it is presumed, from the construction of the substance of the Lord's Prayer, as translated into Arawaak, that that language, at least, has some claims to harmony and expression.

'With the Arawaaks, a particular plaintive intonation is used in inquiries after the health or welfare of those who are ill or unfortunate; and the tone of expression is always suited to the circumstance and situation of the party addressed.

'Though they have no hieroglyphics nor symbolic almanacs, like those described by Humboldt and Robertson, yet they are not without considerable knowledge of astronomy. Every remarkable star or constellation has its Indian title; and they judge of the difference of seasons by the southing of particular stars. Their periods of planting and sowing are regulated by the age of the moon; and in the land-journies of the Accaways over the stony plains of the interior, they are guided by the position of the seven stars, when travelling by night, and by the heat of the stones in the day.

'In reverting to the observations of Humboldt on the language of the Indians, we regret that the only language that has attracted his attention, the Tamanaca, or Cheyma, has led him to conclusions not applicable to the general structure of the languages of Guiana.

'His account of the Caribisce, both as to manners and language, is evidently not deduced from personal investigation and experience. It appears, however, from his inquiries, that the Tamanaque is not a primary language, but a composition of the Arawaak of Guiana with the language of the Incas, since, in the Cheyma tongue, many terms are found, both of Arawaak and Peruvian derivation. The Tamanaque is evidently the language

of the border between the old Peruvian monarchies and the independent tribes of the eastern shores.

'The Caribisce and its dialects is the first great language on this side the border, the Arawaak the second, and the Warow the third, all materially differing in their composition, and never running into each other.

'In the annexed vocabulary, the Accaway language is given as a specimen of a dialect of the Caribisce, and is a fair example of the deductions to be made from analogical comparison. The Caribs call the Accaways a brother nation.

'Without doubt, analogy of language furnishes the surest indications of the origin or derivation of nations; and, though Humboldt ventures to doubt this, yet the very anxiety he manifests in the comparison of the different dialects is a sufficient proof of the propriety of the supposition.'

IV.—*On the Hydrography of South America.* Pamphlets published at Buenos Ayres in 1831, and sent to the Royal Geographical Society.

The attention of the inhabitants of Buenos Ayres is gradually being directed to the navigation of the Rio de la Plata and its tributaries; and two pamphlets on the subject have been published there within the last year. One is entitled 'Ensayo sobre la Topographia de los Rios Plata, Parana, Paraguay, Vermejo, y Pilcomayo, para servir de Memoria à su Navegacion,' por H. C. Dwerhagen; and professes to be published in order to give interest to suggestions previously offered by the author respecting the introduction of steam navigation on the river. The other, entitled, 'Informe del Comisionado de la Sociedad del Rio Vermejo à los Accionistos,' por Don Pablo Soria, is the report of an officer who had been commissioned to examine the Rio Vermejo along its whole extent, to his employers.

Without entering into the particular purposes which these pamphlets are intended to serve, it may be interesting to notice the specific information which they contain, and to combine with it an outline of the more extended views of the hydrography of South America, furnished by M. Humboldt and others. The conformation of that vast region is peculiarly favourable to an extended inland navigation. The Andes skirt its western shore, and ascending to a great height, but descending as rapidly, leave between them and the eastern coast a vast extent of comparatively flat country, divided into the basins of the Orinoco, Amazon, and Paraguay, none of them much elevated above the sea, and even the dividing ranges between them of very trifling altitude. Thus

the Orinoco is navigable without difficulty for two hundred and sixty leagues, to the falls, or rather rapids, of Atures, where its mean height above the sea is, according to Humboldt, not more than three hundred and fifty feet; and thence, after two short *portages*, for above one hundred leagues more, to the point, near Esmeralda, where the celebrated bifurcation of this river takes place, and a portion of its waters descends, along the natural canal of Casiquiare, to join the Rio Negro and Amazon. On both sides, along its course, it receives many tributaries, of which three in particular, the Apure, Meta, and Guaviore, flowing from the westward, have also long navigable courses. The Amazon, again, is navigable to a little above Urarina, near the confluence of the Guallaga, a distance of seven hundred and fifty leagues from its mouth, flowing uniformly along this whole extent, in a direction from west to east, and receiving many tributaries on both sides. By the Napo, Putumayo, and Japura, it is connected with the higher districts of Columbia; its own upper navigation, which is uninterrupted above Santiago, connects it with Upper Peru; and the Guallaga and Ucayale descend to it from the south-west, along the eastern face of the Andes, from distances, as it is said, of from three to five hundred leagues. By the Rio Negro, as already noticed, its waters communicate with those of the basin of the Orinoco; the Rio Branco ascends from this, also, to within a short and nearly level distance (traversed by Mr. Waterton), of the sources of the rivers Essequibo and Demerara; and its southern tributaries, rising in the Campos Pareceis (the mean level of which, west of Villa Boa, and in about 16° south latitude, where the waters divide, is not, probably, above two thousand five hundred feet), approach so closely to the sources of the Paraguay and its feeders, that near Villa-bella, in Mata-grosso, only a short *portage* of three miles divides the course of the Aguapehy, falling into the Jauru and Paraguay, from that of the Guapore, joining the Madeira and Amazon. And, lastly, the Paraguay itself is navigable through nineteen degrees of latitude, from the confluence of the Jauru in 16° 20′ south, to its mouth, near Buenos Ayres, in 35° south; and receives also many tributaries along its course, of which four only need be cited,—the Parana and Uruguay, from the eastward, rivers each nearly equal to the main trunk in volume and importance; and from the westward the Pilcomayo, said to be navigable, with very little interruption, as far as Chuquisaca, and the Vermejo, in which Don Pablo Soria found three fathoms (varas) as high as the junction of the Rio Grande, and learnt that large boats ascended beyond as far as as Tarija.

From these facts, then, it appears that, with the exception of one short *portage* of three miles, water flows, and is for the most

part navigable, between Buenos Ayres, in 35° south latitude, to the mouth of the Orinoco, in nearly 9° north. The distance across the continent from east to west, through which the same convenience exists, varies greatly in different lines; but in the basin of the Orinoco it is not under four hundred leagues; in that of the Amazon it is nearly one thousand; and in that of the Paraguay it varies probably from two to five hundred. And it is thus remarked by Humboldt, that the great elevation of a part of South America is not a more striking feature in it than the uniform low level of so large a portion, that a rise in the Atlantic, of little more than one thousand feet, would submerge considerably above half of the whole continent.

That all the interior provinces of South America would be prodigiously benefited by advantage being taken of these facilities for intercommunication, cannot admit of doubt; but the districts which, as at present the most secluded, would be most strikingly improved by it, are those of Moxos, Chiquitos, and Santa Cruz de la Sierra, in the new state of Bolivia, respecting which the following statements are made in one of the Buenos Ayres pamphlets. They contain about forty-three thousand square leagues of territory; and produce sugar, rice, coffee, indigo, cocoa, cotton (that of Moxos being peculiarly fine), grain, bark and many other valuable drugs, dye-woods, tobacco, canes, numerous kinds of the finest woods, hides, tallow, &c.; all which articles are at present unavailable on account of their bulk, which makes it impossible to transport them by the means yet known in the country. And the only sea-port with which they have any communication is Lamar (Cobija), on the Pacific, although the junction of the Jauru with the Paraguay (where the latter becomes navigable) is only seventy leagues from Santa Anna, the capital of Chiquitos, one hundred from Santa Cruz de la Sierra, and seventy-three from Villa-bella, in Mata-grosso *

* The above analysis would be more distinct with a map: but on a small scale this would be almost unintelligible; and, besides, there are not yet sufficient materials for constructing a map of South America, professedly hydrographic, with any pretensions to minute accuracy. Those who desire to study the subject in detail, may consult Humboldt's Equinoctial Travels, vols. iv., v., and vi., the Corografia Brasilica, i., 294, Mawe's Marañon, &c.; referring to a new map of South America, now publishing by Mr. J. Arrowsmith, in which the rivers, so far as known, are laid down with great distinctness, and nearly all the requisite names are inserted.

MISCELLANEOUS, &c.

I.—*Notices of the Natural Productions and Agriculture of Cashmere.* From the Manuscript Papers of the late Mr. William Moorcroft.

Of bread corn, Cashmere produces wheat, barley, buck-wheat, millet, maize, pulse, amaranthus, and rice; but the latter being raised in great quantity may be considered as the staple.

Turnips, spinach, loose-leaved cabbages, lettuces of the same description, and other common vegetables, raised partly in the usual way, and partly by the ingenious, yet simple contrivances of platforms floating on lakes, with the fruits of the forest or deserted garden, as apricots, peaches, plums, cherries, apples, pears and grapes, along with the Singhara, or prickly water-nut,* constitute the principal support of the very numerous population of the lower classes, who unfortunately have little means of indulging in bread corn.

Sheep are plentiful in Cashmere, the fat being particularly white, the meat dark-coloured, well-flavoured, and might be sold very cheaply were it not for the tax laid upon butchers, and upon the mutton which is brought in for sale.

Cashmere has been formerly one immense lake, the subsidence of the waters of which is distinctly defined by horizontal lines on the face of the mountain. The nature of the composition of the highest and primitive mountains which form the great outer belt of Cashmere, is not thoroughly known to me; but the rocks of the interior line are of secondary formation, and consist, to a great extent, wholly of indurated clay. The bottom of the basin is covered with a deep coat of alluvial clay, which, in its progress towards the surface, is mixed with vegetable earth; and the latter, under very slight labour, breaks down into a rich and most productive mould, which, when neglected after having been cultivated, throws up a thickly matted sod of fiorin or doob grass, little mixed with rank herbage, except in the immediate vicinity of unreclaimed forests.

Many thousands of acres skirting the foot of the hills are covered with apple and pear trees, and vines in full bearing, but without owners.

No copper-mine is worked in Cashmere; but it is said that the

* The dhul or lake of Ooller yields annually from ninety-six to a hundred and twenty-eight thousand ass loads of this nut, of which Runjeet Singh's share, without any expense, realizes a lac of rupees.

existence of this metal is known to several individuals, although kept secret, lest it should become to the government an additional source of profitable oppression. Copper is now imported principally by the way of Lahour, partly of British and partly of Russian origin, and necessarily dear. The mountains of Mooz Tagh yield a copper ore under the form of a carbonate of malachite, which has given fifty per cent. of pure metal. But as no coal has been discovered, and there is but little wood, small portions of this ore are carried off by travellers merely as curiosities.

There are, at present, no lead-mines either worked in Cashmere; and as there is little demand for this metal, it is scarce and dear. However, there are rich veins in situations in Ladakh, where, contrary to the general character of this country, fuel abounds.

Iron is found in Cashmere in considerable quantity, but it is said to be somewhat *red* and *short*, qualities of which it might be readily divested, were it required for work in which they would be inconvenient. It is stated that iron for gun-barrels is imported from Bagmeer, or Bajoura, a circumstance of which I am not fully convinced, as one of my informants had an interest in enhancing the value of iron; and he was contradicted by the testimony of others. At present the Cashmerees are unacquainted with the art of making any other castings of this metal than small shot in a slovenly manner for fowling-pieces; but, with suitable instructions, they would speedily learn to make iron shot for ordnance, as they are extremely ingenious imitators.

The forges of the gunsmiths are constructed in a manner which economises fuel, defends the work from cold air better than those commonly employed in Britain, and thus saves the metal in a greater degree from sealing; whilst the manipulations adopted for purifying and toughening the iron are, probably, not excelled in any country. The forests of Cashmeer abound with walnut, the oriental plane, and with other kinds of wood, well suited for gun-stocks. The walnut is of a much more open grain in its uncultivated state than that of Britain; but by cultivation, and by an ingenious mode of treatment practised during its growth, its wood is rendered suitable for this application.

Although Guthdokh and the neighbourhood of the Yarkund might furnish abundance of agate, flints are imported from Hindostan only, and principally the blunted flints of the British Sepahees. And though the Cashmeree workmen have not made a great proficiency in the art of reducing them into a very regular form, yet they are capable of bringing them into a shape, which with the aid of stiff springs, and a long range of the cock in the locks now manufactured in this city and in Lahour, is not ill adapted to its object.

Sulphur is now imported into Cashmere from the Punjab, and

is of high price. Charcoal is obtained at a very easy rate; and the foundations and other remains of ruined buildings are numerous enough to supply a sufficiency of saltpetre for gunpowder. In the manufacture of this, however, when I was at Lahour, the Sikhs displayed no great skill; but the process is since, I believe, improved.

In Cashmere several varieties of timber may be met with fitting for gun-carriages, and the carpenters are adepts in the employment of the adze and chisel, though little skilled in the use of the saw, auger, or plane.

Through the limited scope for the employment of human labour in agriculture and the arts, in proportion to the population of Cashmere, many of the lower classes are driven to compete with quadrupeds in carrying burdens; and hence, as well as from the internal navigation, the breed of horses in this country has greatly fallen off both in numbers and quality.

Of the Management of Bees in Cashmere.—Every farmer in Cashmere has several bee-hives in his house, and in some houses I have counted as many as ten.

A provision is made for these in building the house, by leaving appropriate cavities in the walls, which somewhat differ in size, but agree in their general form, each being cylindrical, and extending quite through the wall. The tube thus formed is lined by a plastering of clay mortar, about an inch in thickness, and the mortar is worked up with the chaff or husk of rice, or with the down of thistles, which latter is employed also for clay mortar in general, being the first application of this substance to the use of man which I have yet witnessed. The dimensions of a hive are, on an average, about fourteen inches in diameter, and when closed at both ends about twenty or twenty-two inches in length. That end of the cylinder nearest the apartment is closed by a round platter of red pottery ware, a little convex in the middle, but with the edges made flush with the wall by a luting of clay mortar; and the other extremity is shut by a similar dish, having a circular hole about a third of an inch in diameter in its centre.

It does not appear that there is any particular rule for the height of these hives from the ground, as they are sometimes confined to the walls of the lower or basement story, generally appropriated to cattle in the farm-houses of Cashmere; at others are inserted into those of the first floor, and are frequently seen in both situations in the same house, as well as in the walls of its outbuildings. So little difference exists betwixt the practices ordinarily pursued in Cashmere and in Europe, in respect to hiving new swarms, as not to call for notice; but that adopted here for preserving the old swarm when the honey is taken, well deserves

imitation by other bee farmers. Although the season for taking the honey had passed when I visited Cashmere in the beginning of November, the cottagers indulged my wish of seeing the process by which this was effected, with little injury to the bees, and with perfect safety to the individuals concerned in its management, and which was as follows :—

Having in readiness a wisp of dry rice-straw, and a small quantity of burning charcoal in an earthen dish, the master of the house, with a few strokes of the point of a sickle, disengaged the inner platter of the tube, bringing into view the combs suspended from the roof of the hive, and almost wholly covered with bees, none of which, however, offered to resent the aggression, or to enter the room. Having placed the straw upon the charcoal, and holding the dish close to the mouth of the hive, he blew the smoke strongly against the combs, but removed the straw the instant it took fire, to prevent it burning the bees, and quenched the flame before he employed it again. Almost stifled by the smoke, the bees hurried through the outer door with such rapidity that the hive was cleared of its inhabitants within a few minutes; when the farmer, introducing the sickle, cut down the combs nearest to him, which were received into a dish previously slidden underneath them, and left undisturbed about one-third of the combs which were almost close to the outer door. He then replaced the inner platter, and brushing off hastily a few bees which clung to the combs, though apparently in a state of stupefaction, threw them out of the house. Observing many other bees lying motionless on the floor of the hive, I inquired whether they were dead or only stupified, and was answered that they would recover; however, I was not wholly satisfied that this recovery would take place: preparations for continuing my journey at a very early hour on the following morning having unluckily prevented my examining the spot where they had been thrown, until poultry had for some time been feeding near it.

The expelled bees returned as soon as the cavity was freed from smoke without stinging a single individual; and the whole business was completed within ten minutes, without, as was asserted, any perceptible loss. The honey was light-coloured, and of a taste as pure and sweet as that of Narbonne. It possessed less of the cloying quality generally attending this substance than any other I recollect to have met with; and I could not learn that the farmers had any suspicion of its ever being intoxicating or poisonous, as is the case occasionally with that made by the Bhoura (apis irritabilis), or large wild-bee in the northern mountains of Gurwhal, from feeding, as it is reported, on the flower of the monkshood. I was directed more particularly to inquiry upon this subject by

having observed this plant in flower in the valley of Runga, a few miles to the eastward of the bee district, and think it probable that it extends to these mountains.

The peasantry of Cashmere are unacquainted with the employment of honey as the basis of a fermented liquor, but eat it raw or mixed with articles of common food, whilst the most wealthy substitute it for sugar in preserving fruits. It is customary to take the hive every year, and the end of September or beginning of October is found the best season for this operation; a little time still remaining for the bees to add to the portion left for their support during five months. This amounts to about one-third of the whole produce, and would appear to suffice, as swarms seldom die, and the Cashmerees substitute no other article for food. It is stated that an old swarm yields more honey than a young one, and that families seldom die except of old age. I was informed that it was no uncommon circumstance to preserve the same community for ten and even for fifteen years, and some instances were quoted of a family having been retained for twenty years; but this was held to be of very rare occurrence. In consequence of the bees being thus literally domesticated, they acquire a mildness of conduct far more decided than those of Europe; and it is possible that the confidence thus gained, subduing their natural irascibility, may generate an increase of industry, or, at least, an increase of produce in relation to the number and size of the individuals of each community. It is also clear that the situation of the hive keeps many of the natural enemies of the bees at a distance.

The bee of Cashmere is a little smaller than that of Europe, though a little larger than the domesticated bee of Kumaoon and of Gurwhal.

The Bhoura, the rock-bee of Gurwhal, or the bee of the southern mountains, is, on the other hand, greatly larger than the domesticated bee of Europe, and greatly exceeds it also in the number of individuals in each community, and in the size and weight of its combs. But its honey is sometimes contaminated by an intoxicating quality, and the temper of the insect is so irritable as to be brought into a dangerous activity by a slight show of aggression. The former quality is suspected, upon probable grounds, to be caused by the secretion of the aconite eaten by this bee; and its irritability of disposition to be owing partly to the exposed situation of the combs suspended from the lower surface of a ledge of rock, and partly to the occasional attempts of bears to carry them off. Both these detractions from the merit of this bee are merely the result of localities; and, under due precautions, it is presumed that its irascibility might be so far subdued as to render it just as safe an inhabitant of a wall hive as the smaller variety of bee. In a portion of the Punjab, near the hills,

this bee is also met with; and I have seen the under surface of the principal branches of a large Peepul tree studded with so many colonies, individually of such great strength, as to deter the neighbouring peasantry from attempting to deprive them of their stores, notwithstanding it was conjectured that there were several hundred-weight of combs on the tree. The largest of these assemblages of combs, the probable accumulation of several seasons, was of such a size as I think it not prudent to cite; but from the specimens I have seen of the produce of this bee I conceive their domestication, if introduced into Europe, would prove a most valuable acquisition to this branch of farming, although I must confess myself unable to devise any safe and easy plan for transporting such a colony.

Of the Floating Gardens of Cashmere.—The city of Cashmere is situated in the midst of numerous lakes, connected with each other, and with the river Vedusta, by canals, separated by narrow lines and insulated plots of ground; in some localities so far raised above the water-line as to be out of danger of submersion on any rise of the water; but the greater portion lying so low as to be subject to be drowned, in considerable inundations, which are not uncommon, and, indeed, become annually more frequent, through the neglect of the government in not checking the accumulating growth of weeds and mud, which diminish the depth of the lakes, and consequently increase their surface.

These circumstances have suggested an expedient by which certain vegetables are cultivated in safety, and so that they derive as much moisture as may be beneficial to them without being exposed to the risk of being destroyed. This is effected through the medium of a floating support, of which the buoyancy and flexibility prevent the plants sinking into the mass, or being partially covered with it. Various aquatic plants spring from the bottom of the lakes, as water-lilies, confervæ, sedges, reeds, &c.; and as the boats which traverse these waters take generally the shortest lines they can pursue to the place of their destination, the lakes are in some parts cut, as it were, into avenues separated by beds of sedges and reeds. In these places, then, the farmer establishes his cucumber and melon-floats, by cutting off the roots of the aquatic plants just mentioned about two feet under the water, so that they completely lose all connexion with the bottom of the lake, but retain their former situation in respect to each other. When thus detached from the soil they are pressed into somewhat closer contact, and formed into beds of about two yards' breadth, and of an indefinite length. The heads of the sedges, reeds, and other plants of the float are next cut off and laid upon its surface, and covered with a thin coat of mud, which, at first interrupted in its descent, gradually sinks into the mass of matted roots. The

bed floats, but is kept in its place by a stake of willow driven through it at each end, which admits of its rising and falling in accommodation to the rise and fall of the water. By means of a long pole thrust amongst the reeds at the bottom of the lake from the side of a boat, and turned round several times in the same direction, a quantity of confervæ and of other plants are torn off from the bottom and carried in the boat to the platform, where the weeds are twisted into conical mounds about two feet in diameter at their base, and of the same height, terminating at the top in a hollow, which is filled with fresh soft mud drawn from the bottom of the lake, to which sometimes wood-ashes are added, though much more frequently omitted. The farmer has in preparation a number of cucumber and melon plants, which have been raised under mats, and of these, when they have four leaves, he places three plants in the basin of every cone or mound, of which a double row runs along the edge of every bed at about two feet distance from each other. No further care is necessary except that of collecting the fruit; and the expense of preparing the platforms and cones is confined to the value of the labour, which altogether is trifling, as the work is very soon done. Perhaps a more economical method of raising cucumbers cannot be devised; and though the narrow beds are ordinarily almost in contact by their sides, yet, from their flexible nature, they are so easily separable that a small boat may be readily pushed betwixt the lines without injuring their structure; and, for the most part, they will bear a man's weight, though generally the fruit is picked off from the boat. I traversed a tract of about fifty acres of these floating gardens in cucumbers and melons, and saw not above half a dozen unhealthy plants; nor have I seen, in the cucumber and melon grounds, in the vicinity of very populous cities in Europe or in Asia, so large an expanse of plant in a state equally healthy, though, it must be observed, running into somewhat too great luxuriance of growth.

It is presumed that the onion may be raised largely also in this manner, from the fact of my having met with a variety in Ladakh growing in swamps, and which, from its habit and from the colour of its flower, I have named the golden-headed swamp onion, of which some seeds are now transmitted. And perhaps water-culture may be found susceptible of being extended to many other plants besides these. The traveller who finds the water-melon of vast size buried in the hot and dry sand of the desert would not be readily tempted to conclude that it could be raised in nearly equal luxuriance of growth in the cool and humid atmosphere of a floating garden. Yet the fact points out an accommodating power in the constitution of this plant, which may be as largely found in others where at present it has not been supposed to reside. And the subject is of extreme importance, the water sur-

face of our islands having never been suitably called upon to contribute its share of produce to the maintenance of our population*.

On one of my visits to these floating gardens I observed that the stems of many plants had been newly earthed up with a few handfuls of black mud brought from the bottom of the lake. The general depth of the floating beds, or mass of reeds and of earth taken together, was about two feet, and some of the beds were about seven feet broad. The general arrangement was a line of cucumber cones bordering each edge, and one of water or of musk-melon along the middle. The melon plants were peculiarly strong, and their cones were wound round with a fresh addition of confervæ and of other weeds, so as to give to each about five feet in diameter. The season lasts for three months and a half, beginning in June. The fruit is seldom or never pulled in the small or girkin state, and differs in weight, when of a proper age for the market, from about eight or ten ounces to a pound and quarter, or

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* If, in Asia, the traveller visit certain bathing places held as holy, and in which the fish are respected and fed, he will judge more correctly, even by the eye, than can the most experienced angler in Europe of the general difference in the condition of fish produced by a suitable allowance of food daily. And if he have the good fortune to possess a little interest with the officiating priest, through suitable management he may enjoy a proof, still more convincing, of the superiority in quality of those steadily and plentifully fed over those depending for support on an interrupted and incidental supply,—a superiority just as marked as that possessed by the white Dorking fowl, or by the Poularde de Caux, or of Boyeux, over the ill-fed barn-door fowl of their respective vicinities.

I have, in another place, noticed the Singhara or water-nut of the Ooller lake, of which the proportion which falls to the Renter of Cashmere yields above a lac of rupees a year. That the water-nut would flourish equally well in the lakes and ponds of Europe, by analogy with the climate of Cashmere, I entertain not the smallest doubt; but having a suspicion—though only a suspicion—of this nut being somewhat connected with the derangement in the alimentary canal so common in Cashmere, I dwell less upon it than its profitableness invites me to do, although it is possible that I may have taken up the idea too hastily. As a food for hogs, the Singhara may be very valuable; it is most largely productive, and gives considerable occupation to fishermen, who for some months are wholly employed in bringing it up from the bottom by nets somewhat similar to the landing net used for the taking fish out of stews. Some of the nuts are forwarded for trial, and nothing further is required than to throw them into the water. The decaying colour of the leaves indicates the ripeness of the nut, and the extracting them lasts from eight to nine months. But its long and sharp prickles prevent its being eaten, even by the hog, before the kernel be divested of its hard *skin* or *shell*.

The leaves of all the varieties of the Nymphæa lotus, or great water-lily, have thick fleshy stems pierced in their whole length by cylindrical tubes containing a small portion of mucilage. In the autumn, after the plate of the leaf has begun to decay, the stem has acquired its full maturity, and, being boiled till tender, constitutes a wholesome, nutritious, and, I had almost said, palatable article of food.

It may be said that water-nuts and lotus-stalk are likely to prove but a limited resource; but in answer it may be remarked, that about thirty thousand individuals are here almost wholly supported by the former for five months out of twelve, and about five thousand persons live upon the lotus-stalk for nearly eight months in the city alone. The quantity of food capable of being raised from an acre of water thickly planted with the Nymphæa nebumbo, and with the water-nut, amounts to some tons.

a pound and half. From the first setting of the fruit to the time of pulling, seven or eight days are the ordinary period. Having been much acquainted with the unwillingness of the farmers of the east to make a true report of the produce of their farms, I employed a servant of mine, who lived amongst the water-gardeners, to obtain an accurate account of the yield of a cone. He stated, that in answer to his inquiries, the gardeners acknowledged that thirty full-sized fruit from each plant, or from ninety to a hundred from each cone, were the average crop in the season. In the early part cucumbers of full size sell at the rate of about three for a piece of coin of the value of a halfpenny; but as the weather becomes hotter, and the plants get into full bearing, ten, fifteen, and even twenty, are purchased for this price. It is calculated that every cone yields a money return of about eighteenpence, or each plant about six tunga of two pice each. Allowing sixpence for labour of every description, and including also the tax, the clear profit is a shilling for every two square yards. The yield of the melon and the water-melon is numerically less; but the return of profit is at least equal, in consequence of the fruit being sold at from a halfpenny to twopence each. The seed of the melon is brought annually from Baltistan, or Little Tibut, and the first year yields fruit of from four to nine and ten pounds each in weight; but if the seed of this melon be resown, the produce of the second year exceeds not from two to three pounds. On a more minute inquiry it would seem that the melons are sweet and well-flavoured, whilst the water-melons are of the common quality of this fruit. Unless when eaten to great excess, the melon produces not any derangement in the intestines, but otherwise sometimes causes purging. It is remarked that healthy people who live upon this fruit almost wholly during the season, become speedily fat; and the same effect is reported in regard to horses fed upon this fruit at Bokhara. Although water-mint grows spontaneously upon the floats, and the return is so profitable in cucumbers, no other vegetables are raised upon the spaces betwixt the cones. In fact, however, there are so few esculent vegetables in this country, that this apparent neglect affords no matter for surprise. Pennyroyal, cresses, and other useful vegetables, might certainly be raised upon them; and from what I have seen of the aquatic habits of lucerne, I am led to think that this plant would also flourish, and its long tap-root speedily tend to consolidate the crust. Thefts of whole floats are sometimes committed by persons joining in two or three boats to tow them off to distant parts of the lake in the night, and the property thus stolen is difficult to be identified. To prevent this depredation, and also night robbery of the cones, two persons generally sleep in a boat, which is pushed under the shelter of a roof of mats that is permanent during the season. The floating gardens are generally

cut off from the body of the lake by a belt of floating reeds, which also answer, in some degree, the purpose of defending the cones against the effects of winds. The boatways through this fence are closed by twisted withes of willow twigs, which, passing through the ends of the beds, join them so accurately as to prevent the union being recognized, except by persons acquainted with the fence. Altogether this variety of farming is highly profitable, and ought to be adopted in Europe as a great resource for raising food for man.

There are four varieties of walnuts in Cashmere, called khanuk doonoo, which is wild;—wantoo, doonoo, and kaghzee, which are cultivated. The khanuk doonoo, or forest walnut, is diminutive, with a very thick hard shell, and small proportion of kernel so firmly engaged in narrow compartments with strong partitions as not to be worth the trouble of extricating. The nut of Wantoo is a little larger, but the shell cannot be broken except by a sharp blow from a stone or a hammer, nor can the kernel be got out except with difficulty. The nut of the doonoo is somewhat larger still, its shell thick, but in a less degree, and the kernel, large and good, is readily extracted. The kaghzee is so called from its shell being almost as thin as paper, though this, taken literally, in respect to the common paper of Cashmere, is somewhat an exaggeration. However, it admits of being broken by the pressure of the hand, is the largest of the whole, and its kernel is also large and easily removable.

It is not known whether the wantoo and doonoo were originally distinct varieties, and have acquired their character from cultivation; but it is reported that the kaghzee owes its superiority to having been engrafted; the practice of engrafting being, however, at present generally discontinued, from a knowledge of this variety being reproduced from the seed alone, without degenerating. The nuts steeped in water for eight days are planted in the beginning of March, and the shoot makes its appearance on the surface of the soil, generally about forty days afterwards. If the proprietor thinks proper to engraft the trees, this process is performed when the plant is five years old, by the method called, if I am not mistaken, stock-grafting. The head being cut off horizontally to a convenient height, is partially slit or opened in its circumference, and three or four scions are introduced into distinct slits, and retained firmly without the aid of any binding. But clay mortar, worked up with rice husks, is put round it, and kept from being washed away by being enveloped in broad slips of birch bark.

In Cashmere the walnut-tree begins to fruit ordinarily when seven years old, but two or three years more elapse before it is in full bearing. This is conceived to be the case when, in a single

tree, the average annual number of nuts brought to maturity amounts to about twenty-five thousand. It has been observed here, that after a few seasons of full bearing, walnut-trees fall off in producing fruit, and run with great luxuriance to leaf and branch, to which condition the Cashmerees apply the appellation of *must*, and to remedy it cut over the top branches, bringing the tree to the state of a pollard. During the year following, shoots and leaves alone are produced, which are succeeded by a crop of fruit in that ensuing, so abundant as to compensate for the absence of nuts in the preceding year; and, in a few years, when the yield becomes less considerable, this process is repeated, and always with like success. The cut ends of the branches swell into knots or knobs, which are somewhat unsightly, and of which the structure has not been accurately examined.

Cashmere is, probably, indebted to incidental observation, rather than to previous reasoning, for the introduction of this useful practice, for its success has not induced the adoption of the same process in regard to other fruit trees. The hazel, as far as it has fallen under my observation, is here so luxuriant in the production of arborage (leaf and branch), that it rarely brings to perfection its nuts, scarcely of the size of peas, hidden within the long husks of large clusters; nor has any attempt been made, as in the walnut, to improve their quality by grafting or pruning. The vine scales the summit of the poplar and is never restrained by pruning, though compared with it, those of Europe, either on trellis or on the wall, sink into insignificance.

The walnuts which fall green furnish the material for a colour of the same tint, which, however, is not permanent; but the husks of the ripe fruit are sold to the dyers for the basis of a fixed black. When ripe, the fruit of the wantoo walnut is retailed in the city, for eating, at the rate of a hundred for two pice, or about one penny; the nuts of the doonoo, in the same number, for three pice, and of kaghzee for four pice, or twopence. The country people break the walnuts at home, and carry the kernel alone to the market, where it is sold to oil-pressers, at the average rate of seven rupees per khurwar, or ass-load. The khurwar weighs sixteen twink. About twelve thousand ass-loads of walnut kernels are annually appropriated to the oil press in Cashmere, producing, in the gross return of oil and of oil cakes, 1-13,000 rupees, independently of the nuts eaten by man. Walnut-oil is preferred to linseed-oil for all the uses to which the latter is applied; and in Cashmere, as on the continent of Europe, is employed in cookery, and also for burning in lamps, neither much clogging the wick, nor giving much smoke. It is, however, inferior both for cooking and for burning to the oil of til * (sesamum). Walnut-oil is exported to

* This oil possesses such qualities as fairly entitle it to introduction into Europe; and, if divested of its mucilage, it might perhaps compete with oil of olives, at least

Tibut, and brings a considerable profit. It is somewhat extraordinary, that a tree which furnishes timber durable and handsome, and a nut which yields a valuable oil, should not be more cultivated in Britain. According to ancient custom, in Cashmere, the crop of nuts was equally divided between the government and the owners of the tree; but, at present, the former takes three-fourths, leaving but one-fourth to remunerate the farmer. Yet, under this oppression, the cultivation of the walnut is extensive, and Cashmere, in proportion to its surface, produces a much larger quantity of nuts than any portion of Europe. The horse-chesnut is wild in the forests, and has not been reclaimed, but its fruit is said to be largely used in Chumba for feeding hogs.

Rice of many varieties is raised in Cashmere, and the similarity of the climate of this country to that of Britain encourages a hope that it would succeed with us also were the seed-grain employed brought from this province. In Cashmere the year is divided into summer and winter seasons of nearly equal duration, the former, however, being in general somewhat the longest. In 1822 snow began to fall about the middle of December, and the ground was not clear of it in the central part of the province till the end of March. It remained a yard thick in the gorge-like extremities of the frontier valleys until the middle of April; and lies in deep beds for the whole of the year on some of the crests of the mountain-wall which girdles the province. The quantity which falls annually is so great that its weight, resting on the wild apple-trees for some months, bends their boughs downwards into an acute angle with their trunks, giving them an affinity of appearance to the cypress, without diminishing, if not even rather increasing, their fecundity. Falls of snow are extremely frequent during December and the three following months; and the sky is so much obscured that the face of the sun is not discernible oftener than once in three or four days on an average, and then only for a short time. The end of March and the whole of April are distinguished by the popular name of dirty spring or the mud season, and these appellations, in regard to the mud on the ground and the rapid succession of gusts of wind with hail, with short gleams of sunshine, are well deserved. April 1823 afforded only four days of sunshine, and the waters of the neighbouring lakes rose three feet by the accession of large quantities of rain and of melted snow poured into them by mountain torrents. In May scarcely a day passed without a shower; dense clouds, continually resting

for individual purposes, and could be raised in any quantity in the British Indian provinces. It is sufficiently free from smell to admit of being made the medium of extracting the perfume of the jessamine, (yasmeen,) the tuberose, (tumbuk,) narcissus, (neighiz,) camomile, (baboona,) and of the yellow rose, (zeba). The process is managed by adding one weight of flowers to three weights of oil, in a bottle which, being corked, is exposed to the rays of the sun for forty days, when the oil is supposed to be sufficiently impregnated for use.

upon the summits of the mountains, veiled the thick beds of snow by which they were covered. In a word, I have never seen an atmosphere so frequently loaded with moisture; a circumstance probably increasing from the increase of evaporating surface previously noticed. The natives report, however, that this has been an unusually cold and wet season; and those Europeans who have resided for two years in the rude climate of Tibut have yet retained their warm clothing through the whole of May. It is said that June, July, and August, are hot; but the mornings, evenings, and nights are generally cool, and sometimes a failure in the rice crop has been experienced from the summer heat not lasting long enough to ripen the grain; but this is acknowledged to be a very rare occurrence. Rice is sown in the beginning of May, and is fit to cut about the end of August. The grain is either sown broad-cast into the place where it is intended to stand till ripe, or thickly in beds, from which it is transplanted when the blade is about a foot high. As soon as the season will admit, after the 21st of March, the land is opened by one or more ploughings, according to its strength, and the clods are broken down by blows with wooden mattocks, managed in general by women, with great regularity and address; after which water is let upon the soil, which for the most part, of a reddish or foxy earth, is converted into a smooth soft mud. The seed-grain, put into a sack of woven grass, is submerged in a running stream until it begins to sprout, which happens sooner or later according to the temperature of the water and of the atmosphere, but ordinarily takes place in three or four days. This precaution is adopted for the purpose of getting the young shoot as quickly as possible out of the way of a small snail which abounds in some of the washed lands of Cashmere, but sometimes proves insufficient to defend it from the activity of this diminutive enemy. When the farmer suspects, by the scanty appearance of the plants above the water in which the grain has been sown, and by the presence of the snail drawn up in the mud, that his hopes of a crop are likely to be disappointed, he repeats the sowing, throwing into the water some fresh leaves of the prango, called kraugas, which either poison the snails or cause them to descend out of the reach of its influence. The seed is for the most part thrown broad-cast into about four or five inches of water, which depth is endeavoured to be maintained. Difference of practice exists as to watering; but it is generally agreed that rice can scarcely have too much water, provided it be not submerged, except for a few days before it ripens, when a drier state is supposed to hasten and to perfect the maturity while it improves the quality of the grain. In general the culture of rice is little expensive, though more so in Cashmere than in Hindostan, from its being customary in the former country to manure the rice lands,

which is never done in the latter. This manure, for the most part, consists of rice straw rejected by the cattle, and mixed with cow-dung. It is carried from the homestead to the fields by women, in small wicker baskets, and is set on the land with more liberality than might be expected from the distance it is carried. Many of the rice-lands are situated higher than would be thought convenient in Hindostan, and are rather pressed into this species of culture than naturally inviting, but still yield good crops through the facility with which water is brought upon them from the streams which fall down the face of the neighbouring hills. By the Cashmeree farmers the utility of manure is thought rather to consist in its power of keeping the ground pervious to water than in affording pabulum to the plant. In common seasons the return of grain is from thirty to forty for one on an average, besides the straw.

In the time of Zein Ool Abundeen the annual produce of the rice crop is said to have amounted to seventy-seven lakhs of ass-loads, of which the sovereign received one half and the other went to the cultivator,—and it was calculated that there was a consumption of two sers per day per head for the whole population of the country. At present the quantity of rice raised exceeds not twenty lakhs, and the general consumption will scarcely reach one-quarter of the former allowance.

In several mountainous countries greatly distant from one another, and in which much grass, apparently of a good quality, might be cut for hay as winter food for cattle, I have observed a preference to be given to the leaves of certain trees for this purpose:—these were the willow, the mulberry, a variety of elm, and several others, but the first mentioned and the walnut were held to be the best, and considered much more warming and nourishing than any kind of grass made into hay, especially for sheep. Small branches, after having been cut when in full leaf, and before they begin to lose any portion of their verdure, are immediately so disposed within the first forks of the tree to which they belong as to be thereby retained in the form of large hay-cocks. These branches are piled loosely, yet are so engaged amongst themselves as not to be detached by wind, neither do they lose their leaves, nor are the latter rotted or in any other respect injured as to their fitness for food.

I am not mistaken in asserting that the fat is whiter of the mutton of Cashmere, not only than of the mutton of Tibut but of any other sheep I have seen; but whether this difference be wholly or in any degree owing to the sheep being fed upon dry leaves I have not facts enough before me to determine.

This forage, unless where very abundant, is reserved for the severe part of the winter, when the cattle are driven under the

trees on which the store is suspended, and the dry branches being pulled down, are eaten by them with great avidity. The practice is thus simple, unexpensive, affords a considerable resource in a well-timbered, or forest farm, and may, perhaps, be worthy of trial, if it prove not injurious to the growth or quality of the timber; on which I beg to refer to what I have already said of the management of walnut-trees in Cashmere. The scarcity of natural pasturage has forced the farmers of Tibut to cultivate the productions of their soil, as lucerne, merely for increase of fodder; whereas, in Cashmere, the exuberance of natural pasturage has led to the selection of natural productions, and to the neglect of cultivating them to perfection; and the selection of the leaves of forest trees in preference to the leaves and other parts of grasses, and to esculent roots, as turnips, may bring the soundness of judgment of the Cashmeree farmers into question by the farmers of England. My observations on this preference are too limited to be of any practical value; but I am able to aver, that sheep, which had been preserved from dying by the rot, through feeding on dry prangos, fell off in condition greatly when put upon clean washed turnips, and regained their former state rapidly on reverting to prangos. It appears to me not improbable, that if sheep, when they just begin to show symptoms of rot by *arching their back*, were put on a diet of dry leaves alone, they would be prevented dying of this complaint; and I conceive that it would prove speedily curative also in the case of the Oscaris worm nestling in the wind-pipe of lambs fed on rank aftermath in the beginning of a winter following a wet autumn. (The arching of the line of the back, perhaps produced by an attempt to relieve the irritation produced by the vigorous activity of the small fluke-worms which have only just entered the gall-ducts, is a symptom I have never heard noticed by shepherds; but, according to my own observation, is the first, which indicates their presence in the beginning of winter.) When grass is also stored here for winter fodder, it is twisted into thick ropes immediately after having been cut, and in this state hung across the upper branches of trees. Without other preparation for hay it thus keeps free from rottenness, and generally even from mouldiness, notwithstanding the great quantity of rain and snow that falls in this country. Grass thus dried is generally given to the flock in the morning, and leaves in the afternoon or evening; but the latter are most depended upon for fattening. Oil-cake, made of linseed, walnut-kernels, mustard-seed, along with the seed of cotton, are employed for this purpose, and flags or the leaves of sedge.

Other articles of food for domesticated animals are the prangos, the booklook, or yellow lucerne, and the sourna or sand-grass of Ladakh.

The prangos has great merit as a winter fodder for sheep and

goats, curing the rot, and speedily increasing the fatness of sheep fed upon it; it grows upon lands of the most sterile character. For details I must refer to my letter to the Board of Agriculture, as well as in regard to the lucerne.

The crocus of Cashmere has long been celebrated for the excellence of its saffron; and is a source of considerable revenue, its cultivation being very simple and unexpensive. I have procured a few seers of its bulbs, which are much larger than those of Europe. It produces freely the third year after being planted, flowers in October, and lasts many years. In consequence of a report of the root of the alisma plantago major having been believed to have proved useful in Russia in averting hydrophobia from persons who had been bitten by rabid animals, I have also procured a quantity of the dried root for the purpose of being placed at the disposal of the Medical Board; and seed has also been collected under the hope that an endeavour may be made to raise it in the marshes or moist lands of British India.

Deodar—a variety of cedar, having been seen to be particularly durable in Cashmere, both in houses and public buildings under great weight, and also in the spurs and starlings of bridges, I have sought and obtained seeds of it in the forests of Ladakh, and have also taken specimens of the wood from the starlings of the Zein ool Kuddul, where it has been exposed to the water for nearly four hundred years. The shinlik and christa rooroo are varieties, both supposed to be non-descripts or natives of Ladakh; but, perhaps, their merit may not entitle them to higher rank than a place in forests and underwoods. The latter has been treated of elsewhere.

The principal fruits in Cashmere are apples, pears, quinces, apricots, and a non-descript drupe, called sungeet. Apples are common both in Ladakh and in Cashmere; of the former I have treated somewhat largely in a letter to the superintendant of the Honourable Company's Political Garden.

The sungeet has a beautiful appearance, its flowers are exquisitely sweet, and its fruit, by distillation, yields a beverage, in the opinion of the Chinese, not inferior to that of the grape. The fact of sungeet having been raised in Cashmere from seed of Yarkund affords no inconsiderable probability of its being readily acclimated in Britain.*

* Another paper, similar to the above, may be gleaned from Mr. Moorcroft's materials, regarding the arts and manufactures of Cashmere; and also a third, of a miscellaneous nature, regarding Ladakh, in which country he resided two years. It seems desirable, however, to repeat here, that none of the papers which he had with him at the time of his death are yet in the possession of the Geographical Society; and that if any such could still be recovered through the medium of British agents in Caubul, Balkh, or at Bokhara, they would probably be of considerable interest. He died at Anghok (presumed to be in Balkh) in March 1825, and the latest previous information received from him is dated Cashmere, October 1823. —*See* vol. i. p. 233.

II.—*Table of Heights of various Points in Spain*, alphabetically classed.* Communicated by Don F. Bauzá, Hon. Mem. R.G.S.

[L by Water-levels; △ by Geodesical operations; B by Barometer.]

Name of the Mountain.	Province.	Height above the Sea in English Feet.	Means.	Authority.
Alcala la Real	Jaen	2805	Barom.	Betancourt.
Avila	Avila	3485	,,	,,
Almuradier	Nuevas poblaciones of the Sierra Morena	2413	,,	,,
Alcandete	Toledo	2290	,,	,,
Aranjuez	Madrid	1413	,,	Humboldt.
Aranjuez	,,	1703	,,	Antillon.
Algora, (town)	Soria	3812	,,	,,
Alcala de Henares	Guadajara, Madrid	2011	,,	,,
Alcocer	Cuenca	2333	,,	,,
Arencelos, (Muela de)	Borders of Aragon and Valencia	4283	,,	,,
Alcaide (Peak)	Valencia	2813	△	Mechain
Aizquivel, (mount) or Faizquivel	Guipuzcoa, Pirineos	1780	,,	Carta de limites Pirineos
Arza ,,	,,	3033	,,	,,
Alcorrunz ,,	,,	3048	,,	,,
Auza ,,	,,	4268	,,	,,
Adi ,,	,,	4766	,,	,,
Altro Viscar ,,	Navarra	4916	,,	,,
Arzacomendia	Pirineos	3033	,,	,,
Alcarrum	Navarra	3058	,,	,,
Alcolea del Pinar, (village)	Soria, in the mountain of Ministra, Medinaceli	4074	B	Tharluker,
Abril, (mount)	Bizcaya	1285	B △	Ferrer.
Alta de Cagiga hermosa, (farm)	Santander	639	B	Penalver.
Alto del Escudo	,,	3659	,,	,,
Alberca de Duenas	Sierra Nevada	6272	L	Roxas Clemente.
Alcornocal, (summit of Tucar)	Granada Alpujarras	3297	,,	,,
Aldea del Rio	Andalucia, Nuevas poblaciones	462	B	Bauzá.
Atalaya (castle and mount near Cartagena)	Murcia	780	△	Ingenieros.
Bilbao, (at a house in the street Bidabarrieta)	Bizcaya	73	B △	Ferrer.
Banderas, mount de Senales	,,	774	△	,,
Begona Santuario, (the foot)	,,	282	B	,,
Burgos	Burgos	2873	,,	Bauzá.
Buitrago	Guadalajara	3216	,,	,,
(*a*) Bustar Viejo, (village)	Segovia	2998	,,	,,
Barca de Menjibar, (half a league from the village)	Jaen	556	,,	Betancourt,
Baylen, (village)	,, Sierra Morena	1036	,,	,,
Bodegas (cellars) of Don Juan de Micas, in the heights of Canbones, on the summit of Jolucar	Sierra Nevada, Alpujarras	1602	L	Roxas Clemente
Burguete, (village)	Navarra, Pirineos	3050	△	Carta de Pirineos.
Carolina	Cordova, Nuevas poblaciones	1801	B	Betancourt.
Consuegra, (near it)	Toledo, Mancha	2109	,,	,,
Caberagut, (mount)	Cataluña	2529	△	Mechain.
Casueleta ,,	Valencia	2837	,,	,,

* A still greater number of Spanish heights are given in the *Orologie Françoise*, published by the *Société de Géographie* of Paris; but in that work they are classed according to position. They differ, also, in some cases, from those of Don F. Bauzá.
(*a*) See note at the end of the paper.

Name of the Mountain.	Province.	Height above the Sea in English Feet.	Means.	Authority.
Cano "	Valencia	4650	Δ	Mechain,
Castle of de Monserrate, (mount Caballon)	Valencia, five leagues west of Albufera . .	858	"	"
Cabezo, N.E. of Puch . . .	Valencia	191	"	"
Cape Cullera, (tower) . .	"	167	"	"
Cigarraga	Guipuzcoa	1864	"	Ingenieros.
Cercediila, (Inn) . . .	Guadalajara . .	4281	B	Antillon.
Cumbre de Porilla . . .	Santander	4168	"	Antill. (Penalver)
Cerro de Poyales, (highest) . .		4559	"	"
Casas de Ciprian	Santander	1349	"	Penalver.
Casa del Rey	"	2896	"	"
Cima del portal de Cuzco . .	"	3197	"	"
Cabezo de Maria, 1 league W. of Vera	Murcia	6272	L	Roxas Clemente.
Cerrajon de Martos . . .	Sierra Nevada . .	4862	"	"
Cerro delos Machos, (summit) . .	" Alpujarra .	11096	L	"
Cerro dela Caldera " . .	"	10795	"	"
Cerro de Fajos altos " .	"	10778	"	"
Cortijo (farm-house) de Contreras, (highest corner)	"	6905	"	"
Cerro del Barranco de la Ballesta in the Sierra de Lujar, (summit) .	"	5990	"	"
Collado Sabina, (sloped point, covered with junipers)	"	5534	"	"
Cerrajon de Murtas, (peak of the Contrariesa)	"	4862	"	"
Cortijo de Rubite, (the height) .	"	3006	"	"
Cerro de Jolucar, or top of the height so named above the village .	"	2630	"	"
Cross on the Cerro del Hornillo .	"	2065	"	"
Cerro del Conjuro, (in the vineyards of Lujar)	"	1528	"	"
Cerro de la Vina de Pera de Gualchos	"	1183	"	"
Cueva de Pedro y Juan . . .	"	804	"	"
Capuchinos, (convent) . .	Bizcaya, Bilbao . .	332	Δ and B	Ferrer.
Cross of St. Domingo . . .	"	845	"	"
Casa de Atristain, in Archanda .	"	717	"	"
Cerantes, (mount)	"	1526	"	"
Cabo Villano, (watch-house) .	"	879	"	"
Cerro de S. Benito . . .	Close to the Mine .	5505	B	Bauzá.
(a) Cerro de Mondalindo . . .	Guadalaxara	6015	"	"
Cordoba	Cordoba	773	"	"
Cerro de Gibalbin	Sevilla	1325	"	"
Collado dela Plata	Aragon	4382	"	Tharlaker.
Cebollera, (peak of Sierra) . .	Soria	6929	"	Conde de Villa Fuentes.
Durango, (Inn)	Bizcaya	425	"	Bauzá.
Desierto de Palmas . . .	Valencia	2550	Δ	Mechain.
(a) Escorial of San Lorenzo, (monastery and royal palace) . .	Madrid	3683	B	Bauzá
Ditto	Madrid	3266	"	Betancourt.
Ecija, (Inn)	Sevilla	543	"	Bauzá.
Espadan, (peak)	Valencia	3570	Δ	Mechain.
Escudo, (Inn)	Santander	2564	B	Penalver.
Escudo, (summit)	"	3559	"	"
Entrambas Mestas	Burgos, Santander .	504	"	"
Espinosa delos Monteros . .	Burgos	2473	"	"
Eresma river (when descending from Alcazar de Segovia)	Segovia	3035	Δ	Mariano Gil.
El Pozo, (village) . . .	Guadalaxara	2714	B	Antillon.
Fresnillo dela Fuente . . .	Segovia	3346	"	Bauzá.
Fuente de Corcoles	Cuenca	2324	"	Antillon.
Foringana, of Cigarraga, (mount) .	Pirineos limites . .	1864	Δ	Carta de limites.
Granada	Granada	2314	B	Betancourt.
Guarroman	Jaen, Sierra Morena .	1036	"	"
Gateras (mountain and castle near Cartagena)	Murcia	669	Δ	Ingenieros
Guadarrama, (village)	Madrid, Partido de Colmenar	3266	"	"
" Ditto, (port. The Leon of the two Castiles)	Division of the two Castiles	4657	"	"
Granada	Granada	2681	L	Roxas Clemente.
Gador, Sierra	Alpujarras	7130	"	"

Name of the Mountain.	Province.	Height above the Sea in English Feet.	Means.	Authority.
Gibraltar, (highest point)	Cadiz	294	L	
(a) Granja, of S. Yldefonso, (roy. seat)	Segovia	4149	B	Bauzá.
(a) Granja, or S. Yldefonso, (royal pal.)	„	3791	„	Tharlaker.
Gibalbin, (height)	Sevilla	1325	„	Bauzá.
Guadalaxara	Guadalajara	2334	„	„
Guadalquivir, (source of the)	Jaen, Sierra de Cazorla, one league south of this town	526	„	Roch.
Gorbea, (mount)	Alava, borders of Bizcaya.	3301	Δ	Ferrer.
Gainecogorta, (mount)	Bizcaya	3307	„	„
Haya, (mount above Yrun)	Guipuzcoa	2632	Δ	Ingenieros.
Honrubia, (village)	Segovia	3231	B	Bauzá.
Herreria delos Chorros	Soria	3989	„	Antillon.
Hadi, (mount)	Navarra, Pyrenees	4767	Δ	Carta de limites.
Hausa „	„	4268	„	„
Haza de las Granjas, (by the side of the Vambla de Lujar)	Sierra Nevada, Alpujarras	290	L	
	„	2410	„	
Hornillo, (beginning of the ridge)				
Jerez dela Frontera, (house of the Marquis Panes)	Sevilla	571	B	Bauzá.
Juanilla, (inn)	Segovia	3708	„	„
Jaizquivel, (mountain)	Guipuzcoa	1781	Δ	Ingenieros.
Jolucar, (mountain)	Sierra Nevada	2632	L	Roxas Clemente.
Laguna de Majano	„	9746	„	„
Laguna dela Caldera	„	10117	„	„
(b) Laguna de Urbion	Rioza, Sierra de Cameros.	6782	„	Conde de Villafuentes.
Lower line of snow on 15 Aug. 1804	Sierra Nevada	9064	„	Roxas Clemente.
Lujar, (highest summit)	„	6218	„	„
Lujar, (village)	„	1714	B	„
Leon delas dos Castillas, (mountain of the port of Guadarrama)	Madrid	4657	„	Betancourt.
Lerma, (village)	Burgos	2841	„	Bauzá.
Lujua „	Bizcaya	108	Δ	Ferrer.
Lierganes „	Santander	362	B	Penalver.
Lleberia, (mount)	Valencia	3016	Δ	Mechain.
Lumbreras	Rioza, Sierra de Cameros	4588	B	Con. de Villafuen.
(a) Madrid	Madrid	2098	B	Penalver y Otros.
Madrid	„	2222	„	Bauzá
(a) Miraflores dela Sierra, or Porquerizas, (village)	Guadalaxara, department of Colmenar	4028	„	„
Mondragon	Guipuzcoa	706	„	„
Miranda de Ebro	Burgos	1514	„	„
Menjibar	Jaen	962	„	Betancourt.
Manzanares, (city)	Mancha	1982	„	„
Madridejos, (village)	Toledo	2109	„	„
Mola, or Muela de Ares del S. (mount)	Valencia	4237	Δ	Mechain.
Do. del N. (mount)	„	4281	„	„
Mutas, (Peak of Montealegre)	„	1537	„	„
Monira de Cucalo, (mountain)	„	2223	„	„
Monella, (Mount of Garrat)	Cataluña	1945	„	„
Mongo, (mountain)	Valencia	2429	B	„
Monsia de Lloret	Cataluña	883	Δ	„
Monserrate, (in the Chapel of the Virgin)	„	4053	„	„
Malasima, (mountain in Monsia)	„	2504	„	„
Montagut	„	3131	„	„
Mendaburu, (mount)	Pirineos	3685	Δ	Carta de limites.
Maria (sierra)	Murcia	6274	„	Roxas Clemente.
Mulahacen, (highest peak)	Sierra Nevada	11666	L	„
Molina, (city)	Aragon	3466	B	Tharlaker.
Menera, (sierra, division between Molina and Aragon, on the road from Molina to Teruel)	„	4333	„	„
Mine of Collado dela Plata	„	4381	„	Antillon.
Molino de San Pedro, (near the River Guadiela)	Cuenca	2036	„	„

(b) The Count of Villafuentes says, a thousand imaginary stories are told of the lagoon of Urbion, about its infinite depth and subterranean communication with the sea. We ascertained its depth to be 261 English feet, its breadth being 411 feet. It presents the appearance of the crater of an extinct volcano, and in various parts of the cavity by which it is surrounded, scoriæ may be found.

Name of the Mountain.	Province.	Height above the Sea in English Feet.	Means.	Authority.
Murcia, (city)	Murcia	447	B	San Luis Vando.
Mont-perdu, or the Three Sisters	Frontiers of France	11282	△ and B	Ramond.
Nava Cerrada, (puerto)	Guadalaxara	6044	B	Tharlaker.
Ditto, ditto	"	6030	"	Humboldt.
Ois, (mount)	Bizcaya	3414	△	Ferrer.
Ollargan, (mount)	"	1226	"	"
Ori, (mount)	Pyrenees, Navarra	6595	"	Carta de limites.
Ontaneda, (village)	Santander	570	B	Penalver.
Peñas Blancas	Sierra Nevada, Alpujarras	7605	L	Roxas Clemente.
Peñas Blancas, (the 4 fountains).	"	7290	"	"
(a) Peñalara, (highest point)	Segovia, Tierra de Guadarrama	8240	B	Bauzá.
(a) Ditto, ditto.	"	7772	"	Tharlaker.
Plata, (hill)	Aragon	4382	"	"
(a) Peñalara, (highest point)	Segovia, Sierra de Guadarrama	7756	"	Anales de Ciencia. No. xv. p. 238.
Perenchisa, (mount)	Valencia	856	△	Mechain.
Peña de Bel	"	4081	"	"
Picayo, (eastern mount of the chain of Montemayor)	"	1278	"	"
Pozhondon, (village)	Aragon	4637	B	Antillon.
Puente en el Fajo, (between Auñon and Sacedon)	Cuenca	1913	"	"
Poyales,—cerro, (highest part)	Old Mine	4559	"	"
Portazgo de Guadarrama	Guadalaxara	4063	"	Betancourt.
Puerto del Rey, (greatest height)	Jaen, Sierra Morena	2251	"	"
Pinos, in the river Cubillas	Granada	1856	"	"
Pinilla de Foranzo	Burgos, Laredo	348	"	Penalver.
Portal de Cuséo, (summit)	Santander	3197	"	"
Portillo de Bedore	"	3499	"	"
Puerto de Lunada, (on the road there is a higher peak)	"	4044	"	"
Puente de Miera	Burgos, department of Laredo	784	"	"
Pan de Azucar, (mount)	Bizcaya	2983	△	Ferrer.
Pamplona	Navarra	1584	L	
Pico de Urbion	Rioja, Sierra de Cameros	7209	B	
Quintanapalla, (village)	Burgos	3057	"	Bauzá.
Rapita de Espadan, (mount)	Cataluña	3610	△	Mechain.
Rhune, or Larrum "	Guipuzcoa, Pirineos	2956	"	"
Roldan, (mount west of Cartagena)	Murcia	1828	"	Tofino.
Riba Fajada, (village)	Cuenca	2840	B	Antillon.
Siete Picos, (eastern peak)	Segovia	7298	B	Bauzá
(a) San Ildefonso, (palace)	"	4149	"	"
Somosierra, (highest point)	Guadalajara	4799	"	"
S. Maria de Cubo, (village)	Burgos	2259	"	"
Setiles, (village)	Department of Cuenca, Molina of Aragon	4035	"	Nota de Antillon.
Segovia, (castle)	Segovia	2299	"	San Mariano Gil.
San Rafael, (inn)	Avila	3873	"	Betancourt.
Soncillo, (village)	Burgos	2811	"	Penalver.
Serantes, (peak)	Bizcaya	1526	△ and B	Ferrer.
San Juan, (hermitage near Artafulla)	Valencia	302	△	Mechain.
Silla de Forrellas	Mallorca	5307	"	"
Tarragona, (cathedral)	Cataluña	403	"	Mechain.
Torrellas, (saddle of the mountain)	Mallorca	5298	"	"
Ditto, from Monjuich	"	5281	"	"
Ditto, (from Palma)	"	5307	"	"
Torre del Puig, or Puch	Valencia	27	"	"
Toro, (mountain)	Menorca	1227	B	Cini.
Torija, (village)	Guadalaxara	3266	"	Antillon.
Teruel, (city)	Aragon	3014	B	Tharlaker.
Turia, (river, opposite Teruel)	"	2887	"	"
Toledo, (Episcopal palace)	Toledo	1868	"	Antillon.
Tembleque, (port of S. Juan)	"	2029	B	Betancourt.
Torre del Campo	Jaen	1933	"	"
Ferreras (rock near the Tagus	Sierra Nevada, Alpujarras	436	L	Roxas Clemente.
Torrejon de Ardoz, (village)	Madrid	1924	B	Antillon.
Tendilla "	Guadalaxara	2338	"	"

Name of the Mountain.	Province.	Height above the Sea in English Feet.	Means.	Authority.
Urbion, (peak in the Sierra de Carneros)	Rioja	7272	„	Conde de Villafuentes.
Urribarrigamboa, (village) . .	Guipuzcoa . . .	1791	„	Bauzá.
Veleta, (peak)	Sierra Nevada . . .	11387	A	Roxas Clemente
Vergara, (village)	Guipuzcoa . . .	706	B	Bauzá.
Vitoria, (city,—inn)	Alava	1777	„	„
Vigia, (signal post) of Cabo Villano	Bizcaya	879	Δ	Ferrer.
Vigia, (ditto) of Senales in Bilbao, (mountain of Banderas) . .	„	773	„	„
Valencia, (city)	Valencia	95	B	Baron de la Puebla.
Valencia, (square of the cathedral)	„	196	„	Antillon.
Villafranca, (roof of the church) .	Cataluña	831	Δ	Mechain.
Vallobrega, (in the mountain of Monsia)	„	2053	„	„
Villa Lain, (village)	Burgos	2111	B	Penalver.
Venta Nueva	Santander	3206	„	„
Valdepeñas, (village)	Mancha	2119	„	Betancourt.
Villarta	Mancha	1947	„	„
Zaragoza	Aragon	899	„	Antillon.
Zornoza	Bizcaya	221	„	Bauzá.

The height of the loftiest peak of the Sierra Nevada was ascertained by Don Simon de Roxas Clemente, librarian at the Royal Botanical Gardens at Madrid, by means of a water level, the only one which could be got in Granada. On the 4th of August, 1804, being on the peak of Mulahacen, he commenced his operation, and terminated it on the sandy beach of the Castel de Ferro at the end of fifteen days, having made 657 stations.

The difference of level between Bilbao and Madrid has been taken at 2222 feet, being the mean of various corresponding observations, with a barometer made by Troughton; and on this height depend all those places marked (*a*), observed simultaneously with Madrid.

As soon as a series of some years observations shall have been obtained at the Hydrographic Office of Madrid, the height of that city above the level of the sea will be determined with greater precision.

F. BAUZÁ.

London, 1831.

III.—*Memoir Descriptive of Prince's Island and Anno Bom, in the Bight of Biafra.* By the late Captain Boteler, R.N.

PRINCE'S ISLAND—according to Barbot, was discovered in the year 1471, either by Santarem, John de Escobar, or Fernando Po; and was named Ilha do Principe, in honour of the celebrated prince, Don Henry of Portugal. It is the smallest island, excepting Anno Bom, of the four situated in the Bight of Biafra, and does not exceed nine miles and a half in length, by six miles in breadth.

Of volcanic origin, Prince's Island presents, towards its southern extremity, a mass of steep elevations, with abrupt craggy faces, and two or three pinnacles of great height and singular appearance, resembling, as it were, gigantic nine-pins. The loftiest mountain probably exceeds four thousand feet; and, were it not for the dense clouds which seldom leave it clear, would be seen at a great distance. We have discerned it in the Cornelia, when above one hundred and thirty miles off; and even the low peaks of Fernando Po we have seen at the distance of ninety miles.

The mountainous portion of the island occupies about one-half of it, and is mostly left in a state of nature; but the remainder, though cut up by deep valleys and ravines, and studded with conical hills and acclivities, is cultivated to a degree highly creditable to the inhabitants, chiefly with coffee, of which the plantations, some time back, yielded great profits, now much reduced from competition. Provision crops constitute another staple; but the demand for them also is now much reduced, in consequence of the ill treatment which several ships have here received. And when I was on the island, the slave-trade, checked as it was, formed, I believe, the chief support of the inhabitants.

Although Prince's Island is much smaller than St. Thomas's, and has not the advantage, like that, of being the residence of the governor-general; yet its inhabitants are much the richer, and the more civilized. At St. Thomas's there is only one white gentleman, besides the governor; while at Prince's, there are, at least, five, all engaged in commercial pursuits. This is owing to the superiority of the ports of the latter, and also, in some degree, to its position nearer the main land. It was once occupied by the Dutch, who, about the end of the sixteenth century, attempted, to colonize it. But their settlement was afterwards broken up by the natives, assisted by the Portuguese; and the principal fort, St. Antonio, still exhibits mementos of these ancient hostilities, during which its guns were dismounted, and

thrown over a precipice beneath, their place being now supplied by others.

There are two rainy seasons at Prince's Island, the first commencing about the 15th of April, and lasting till the 10th of June; the second continuing from the 25th of August to the 15th of November; besides which the island is subject to occasional very heavy rains even in the dry season. Tornadoes are frequent on it from half November to half May; at other times, although appearances are often threatening, they never occur. They generally blow from S.E. to N.E., and from these directions are always strongest; but sometimes, though rarely, the wind veers in them all round the compass. Their duration may be estimated at from fifteen to forty-five minutes, the former period being the most common; their fury is such, as even in this short space of time to raise a very heavy sea. Should they occur at or near full or change, they generally alter the direction of the current to W.S.W. and W.N.W.; which appears to me to confirm an idea which I have long entertained, that the currents along the west coast of Africa are caused by the winds, and promptly conform themselves to it, though at times with striking deviations, arising from remote causes, the influence of which is soon exhausted. All the currents along Prince's Island set strong, and, in the dry seasons, commonly from N.N.W. to N.N.E.

From the quantity of rain which falls on the island it is well supplied with fresh water; and as a good bank of soundings extends along its whole north or lee side, and several good ports also exist in it, supplies are easily procured. The best harbour is St. Antonio, except during the tornado season, when West Bay is safer; along the south side of the island the water is too deep, and the surf on the beach everywhere too heavy, to make approach safe or convenient.

The prevailing disease at all these islands is a bilious fever, which, although it resembles the yellow fever, is not altogether the same. Both blacks and whites suffer from it; and its effects are usually so very severe on Europeans, as to leave them constantly in danger of relapse, even when they recover from, or, at least, survive the attack, and to change them, from apparently robust and healthy men originally, to emaciated, yellow, sickly, and cadaverous objects. Yet one remarkable instance is on record of a European in St. Antonio living sixty-four years on the island, and attaining the age of eighty-four. Disease is equally prevalent throughout the whole year, except during the immediate influence of the tornadoes, of which the effect is always refreshing and salutary; but the hot season is the most pernicious to Europeans, and the cold to blacks. The usual treatment is blistering, cupping, and throwing in bark as the patient recovers.

The following are the refreshments which may be procured at Prince's Island, either for money, or by way of barter—viz. bullocks, sheep, goats, pigs, fowls, eggs, yams, cassava, pumpkins, pine-apples, bananas, plantains, sour-sops, and cocoa-nuts.

Anno Bom—is the most southern and smallest of these islands, its length not exceeding four miles, nor its breadth two; dimensions which appear extraordinary when compared with the accounts usually given of it, some of which assign it a circumference of thirty miles. Like Prince's Island, it is mountainous, rising abruptly from an unfathomable depth to nearly three thousand feet; but its heights are rounded, like those of Fernando Po, rather than peaked and pointed like those of the other two islands, excepting where one lofty, precipitous mass rises abruptly from the adjoining mountain range, which, at its base, is about eight hundred feet high.

The peculiar appearance of this peak induced some of the officers of the Hecla to ascend it, which they found a task of extreme difficulty, and even danger; for, besides the great steepness of the ascent, they had carefully to examine every stone before they attempted to drag their weight up by it, or use it as a resting-place for their feet, as they were all, more or less, loose, and of compact cellular lava, though, strange to say, of a slate-like fracture, and in a state of decomposition, caused, probably, by the action of the sun after heavy rain. The summit was found to be flat, narrow, and scarcely ten yards in length; and the wind swept over it with a violence which threatened to drive the party from the place which they had gained with so much difficulty. Two low, worm-eaten crosses had been erected on it by the natives; but one was broken over, and the other threatened speedily to follow. The descent was very perilous; and, on one occasion, a rocky fragment was detached which nearly destroyed the whole party. At the foot a small lake was found, about three quarters of a mile in circumference, which, from its appearance, and the report of the natives, was judged to be of great depth; but on getting a canoe launched on it, only nine feet were found in the deepest part. The bottom was a stiff, bluish clay; and the water was very sweet, but thought by some to have a reddish tinge, which, however, could not be very decidedly pronounced.

The population of Anno Bom is about 3000 souls, chiefly collected in a large village near the north east point of the island, off which is the only tolerably safe roadstead for shipping round it. The bank of soundings is here about one-third of a mile in breadth, and sheltered from all the prevailing winds, except during the tornadoes, when the ascent is too steep to allow an anchor to drag; and the chief precaution necessary is to ride with a chain, to prevent the cable being cut. In taking up a position, the rule

is, not to anchor in less depth than seventeen fathoms, with the conical peak, already described, bearing S.S.W. ½ W., (magnetic) when the distance from the shore will be little more than half a mile, giving room to veer to the strength of a tornado, and yet sufficient hold of the bank to avoid being driven off by the prevailing winds, which sometimes rush down from the mountains with great violence.

The chief object in visiting Anno Bom is to procure refreshments, of which the supply, however, is not so great as is usually imagined. The sheep are small and well flavoured,—goats and pigs abundant, fowls scarce, especially guinea-fowls,—fish plentiful, as also cassava, plantains, cocoa-nuts, bananas, lemons, tamarinds, sweet potatoes, guavas, and Seville oranges. Pine-apples are scarce. Water is abundant on the island, but not easily procured by shipping, on account of the heavy surf on its shores. All articles are procured more easily by barter than for money;—cheap tawdry handkerchiefs, old clothes, muskets, fish-hooks, cutlery, trinkets, rum, and tobacco, being the objects chiefly coveted; and a small quantity of the two latter is expected also as a present with every considerable bargain.

The wood in most abundance on the island resembles in appearance the cotton-tree; but is unfit for fuel on account of its spongy nature. Smaller and better wood for this purpose can be procured; but only in small quantity.

The regular winds at Anno Bom are from the south-west, excepting during the tornadoes, which occur more rarely than at Prince's Island, and only in March and September. Less rain also falls here than in the other islands, the rainy seasons being confined to April and May, October and November. The favourable accounts, however, generally given of the climate must be received, I think, with caution, not having been borne out by our own experience of it.

The natives are perfectly harmless, and have some vague idolatrous idea of the Roman Catholic religion. In their dealings with strangers they are not strictly honest, but as much so as can reasonably be expected. Their houses are small and rudely constructed of rough unhewn boards, grass, mud, and the foot-stalks of the cocoa-nut tree. They have also some small chapels of the same construction; and the king's, or governor's, house is not better than the others. (This man is a native of the island, totally independent of the Portuguese, and does not appear to have much authority;—he comes off, however, to shipping in great state, seated in a chair, with an umbrella over his head, and expects—but very seldom receives—a salute; his principal object being to obtain presents, which may thus be considered the port-dues of the place.) In various parts, between the sea and the huts,

long piles of stones are thrown up, for the protection of the inhabitants against shot from the roadstead, a precaution which the wanton conduct of the Spanish slavers has suggested; and the arrival of one of these, accordingly, for the most part, sends the inhabitants to the mountains, at least during the night, forty-six of them having been lately surprised and carried off as slaves, and eighteen deliberately massacred by one of these vessels.

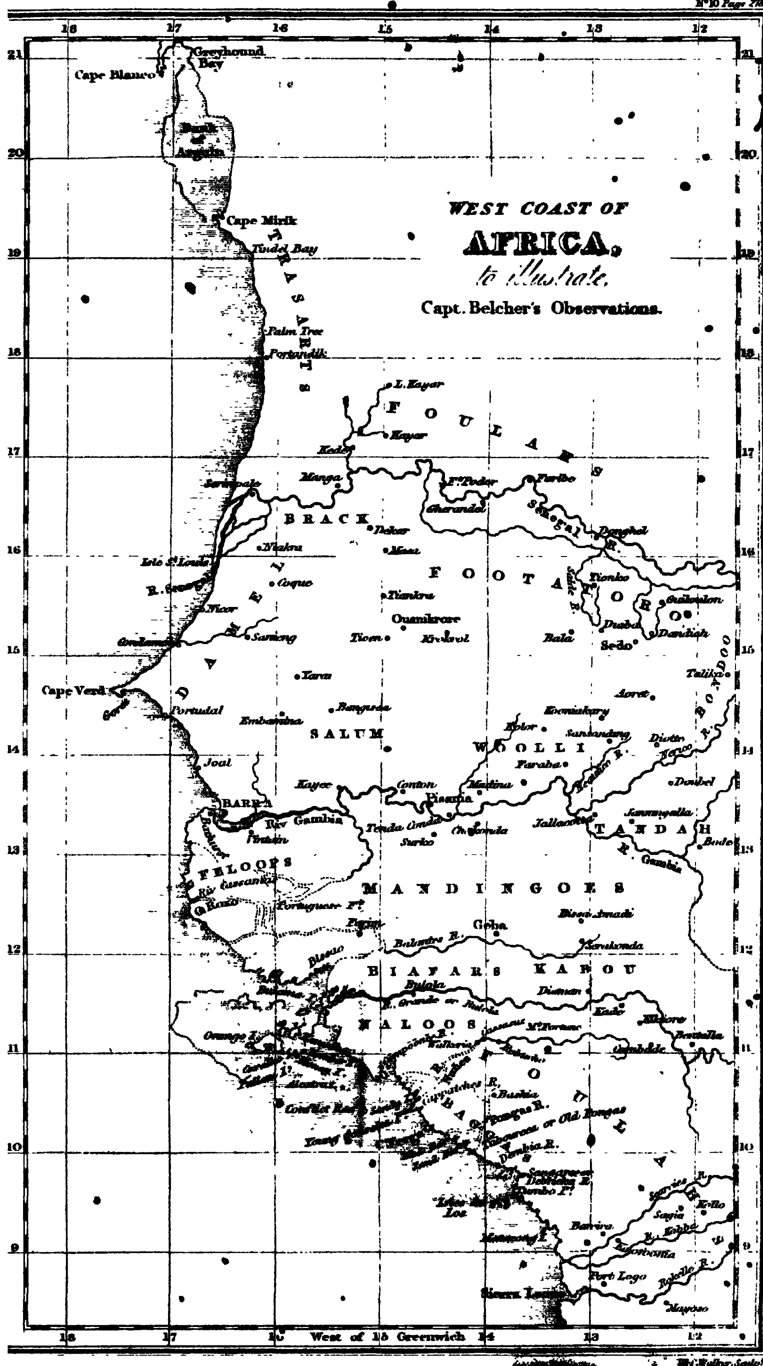
Anno Bom, from its small size, distance from the coast, and bad harbour, has never risen to importance; but yet, in many respects, it seems to me more eligible for a settlement than any of the other islands on this coast. It is decidedly the driest and most healthy; and the inhabitants would receive any permanent establishment with open arms, were it merely as a protection from injuries of the above nature. It is not included among the titles of the Portuguese governor of St. Thomas's, and is entirely independent of him.

IV.—*Extracts from Observations on various Points of the West Coast of Africa, surveyed by his Majesty's Ship Ætna in* 1830-32. By Captain Belcher, R.N.

The survey commenced at the Isles de Los, which consist of three principal islands, Factory, Crawfurd, and Tamara, or Footabar islands, besides several small islets or reefs, inclosing a convenient and safe anchorage for shipping. On Factory Island is a small factory which keeps up a communication with the main, the natives thus procuring English goods for rice, wax, hides, a little ivory, bullocks, goats, fowls, yams, pumpkins, cassava, bananas, limes, cola (the coffee of Soudan)*, pistachio-nuts, and, in the rainy season, oranges, and a few other fruits. Factory Island is well cleared of its woods, but the others only partially so. Good water is to be had on Tamara Island, and all the islands are said to be healthy, but with something, perhaps, in the atmosphere, or mode of living, which favours the formation of cataracts in the eye, many of the natives being affected with them. Vessels with much sickness on board might certainly resort hither with advantage. The thermometer at noon stands generally about 82°.

The Isles de Los are of volcanic origin, being formed chiefly of hard blue and iron-coloured lava, with occasional masses of

* The Mandingo name for this is Gourou, which they pronounce Wurru. It is astringent and bitter, and seems to contain tannin. The natives use an infusion of it, which resembles coffee; and as, when eaten raw, it removes hunger, it is carried in expeditions for this purpose. As an article of traffic it is said in some parts of the interior to be worth its weight in gold, being used by the natives whenever they can procure it.


WEST COAST OF
AFRICA,
to illustrate,
Capt. Belcher's Observations.
Greyhound Bay
Cape Blanco
Bank of Arguin
Cape Mirik
Tindel Bay
Palm Tree
Portandik
TRASARTS
L. Kayar
Kayar
FOULAHS
Kedo
Manga
Ft. Podor
Faribe
Gherandal
Senegal
Danghel
BRACK
Dekar
Nialna
Maaz
FOOTA TORO
Isle St. Louis
R. Senegal
Coque
Tiankra
Tionko
Saldé R.
Guiloulon
Niaor
Ouamkrore
Diaba
Dandiah
Saning
Tioen
Krokol
Bala
Sedo
Cape Verd
Goree
Yara
Talika
BONDOO
Portudal
Embaraina
Banguda
Kooniakary
Aoret
SALUM
Kolor
Sansanding
Diotto
WOOLLI
Faraba
Joal
Kayee
Canton
Pisania
Madina
Doubel
BARRA
Riv Gambia
Tenda Conda
Chalamula
Jallacotta
Jammagalla
TANDAH
Bode
Pintain
Surko
R. Gambia
FELOOPS
Riv. Cassanian
MANDINGOES
Portuguese Ft.
Geba
Bissa Amadi
Balandre R.
Kandonda
BIAFARS
KAROU
Bissao
Bulola
Diaman
R. Grande or Bulola
Orange I.
NALOOS
Kade
Elikore
Bentalla
Gambdde
Alcatraz
Bashia
Pongas R.
Dembia R.
Isles de Los
Bairiro
Port Logo
Sierra Leone
Mayoso
Kollo
Sagia
Rokelle R.
West of Greenwich
Walker, Sculpt.

porphyritic hornstone at different elevations. Of the vegetable productions the most remarkable are the palms, which furnish palm-oil and wine, and the silk cotton-tree. The natives also speak of a tree, the bark of which is an excellent bitter; but it was not seen.

The natives belong to the tribe named Baccas, or Barkas, who also occupy other islands along the coast. A great similarity exists between their language and that of the tribes inhabiting the banks of the Nuñez.

Tumbo Point is about two miles distant from Factory Island; and is a long rocky flat, partly covered at high water, and divided from the main by a narrow channel, navigable for canoes at high water, but nearly dry at low, where the natives affirm that they can walk across, though the depth of mud makes this improbable. From this the main-land rises gradually, and partakes much of the features of the Isles de Los, without, however, being quite so denuded as the summit of Tamara. The whole interior is mountainous, the highest peak of which we could obtain a measurement being 2910 feet above the sea. This mountain is called Kakulimah. Farther on, the Sangaree, or Soomba ridge, commences, which forms the entrance of the Sangaree, or Debrika River. Its highest point is called Tikitee-chin, or, as pronounced, Tikit-chin, and is 1705 feet above the sea. Its western point is that called Alligator's Point on the chart; off which the mud extends above a mile, dry at low water.

The whole of this bay is one series of flats and reefs; and no vessel drawing above six feet should venture within a line drawn from Tumbo to Alligator Point. Vessels drawing fifteen feet water should not, when working up along this shore, do more than open Crawfurd Island; and to ensure good room, should even tack when the west end of Tamara opens the south end of Factory Island. Within these bearings the soundings are very regular, and no where less than five fathoms.

The coast appears to be an immense series of islands, some forming, others disintegrating; so that in twenty years its aspect will be probably materially changed. The entrance of the Sangaree River has at present two fathoms in it; but there is little inducement to ascend it, there not being the slightest trace of trade along its shores, nor any supplies to be procured from them, except of wood. The water is scarce and bad. The Ætna's boats ascended fifteen miles.

From Alligator Point the coast runs north-west (true) five and a half miles to a small island in the centre of a river called the Dembia, but which is, in fact, a mouth of the Sangaree. It will admit very small vessels; but the greatest depth is only one fathom at low water, where the sea curled. Thence the shores are

low, and thickly clothed with mangroves, extending about sixteen miles to the first acknowledged mouth of the Pongas, called Tabouria, or Old Pongas; but another inlet occurs within the distance, which could not be approached; neither, indeed, was the Tabouria examined, the line of breakers being a mile outside of it; and being only used by canoes which, keeping within the breaker line, communicate thus along shore without much risk, it was deemed unnecessary to incur hazard and delay by its examination. Three miles beyond Tabouria is the Sand-bar entrance to the Pongas, and about the same distance farther, that called the Mud-bar. The first is constantly shifting, and therefore very unsafe. The second is only muddy in the channel, the banks being hard sand, and may be entered easily and safely at high water by vessels not drawing more than twelve or fourteen feet. From the flatness and uniformity of the shore there are few or no leading marks; but the channel is sufficiently distinct with a little care.

The resources offered by the Pongas are few, without proceeding a great distance; and even then appear but trifling, and cannot be obtained by money. The trade is confined to rice, skins, bees-wax, cola-nut, gold-dust, a small quantity of ivory, and slaves. Stock is scarce, the water bad; and arms, ammunition, tobacco, and handkerchiefs, are the only equivalents coveted. The seine was hauled twice off the entrance with good success; and some varieties of fish were procured, not previously known. One was a species between the shark and raia, having the teeth of the latter, but otherwise resembling the former. It is one of the finest fish on the coast; the fin parts, like those of the skate (raia vates), making most excellent soup; and, as another great advantage, it does not decompose so rapidly as other fish, and was kept good for two days in the Ætna's boats. The cat-fish (silurus) was also taken; and though treated usually with disdain is both a well-tasted and peculiarly wholesome fish; in proof of which it may be added that the natives give it a decided preference, and are rather cautious of others.

About four miles north of Mud-bar is another entrance of the Pongas, but very shallow; and beyond is a deepish bay, the western extremity of which is called Cape Verga, which is the termination of some moderately elevated land, and not a mangrove island, as laid down in former charts. A long dangerous spit extends from this six miles and a half to the north-west by compass, north 75° west, true. Beyond is a deep bay, into which no vessels venture which draw above four or five feet water. The chord crossing it to the mouth of the river Cappatches is in the direction north 21° west (true), fifteen miles, on which line the depth seldom exceeds one fathom. The Cappatches is a trading

river, but shallow, and only frequented by boats, or vessels drawing not more than four feet water.

About five miles true west from Cappatches is the point called Young Gonsalez, the south-west extremity of the southern minor inlets to the Rio Nuñez. It is a small island, from which a long dangerous flat of rocky ledges, gravel, and sand, extends to the south-west, by compass, nearly six miles. At low water, a patch, three-quarters of a mile in length, is about six feet above water. Its composition is a coarse red sandstone, or conglomerate, like lava till broken. Young Gonsalez is the southernmost of three islands, having channels communicating with the Nuñez; its distance from the regular entrance of the river is about five miles.

Vessels bound to the Nuñez should make the land in 10° 30′ north; or, if coming from the southward, should, at least, not come into less than seven fathoms till in that latitude. They will then approach the river, steering north 75° east, true, or south 86° 30′ east, magnetic, through regular soundings; and it is chiefly necessary to remember, with a flood-tide, that there is a dangerous rocky flat on the starboard beam going in, while, on the other hand, a vessel may play with the edge of the breakers on the point of the Sandy Island on the larboard side. The constant warning, also, 'Keep in mud,' which is familiar in all channels along this coast, should be here especially kept in mind.

To a vessel wishing to refit, no place can be better adapted for the purpose than the Sandy Island just mentioned. It is uninhabited. A vessel may be moored safely within one hundred and fifty yards of low water-mark, or even less if required; but should be prepared to haul off in the event of a tornado. Small vessels may be grounded, or hauled up, for repair or examination; a space sufficient for the encampment of the crew even of a line of battle ship is free from trees; and stores may be conveniently landed. Immense quantities of drift wood lie piled on the south-west side; and plenty of live timber grows on the island, of which the palm yields an excellent cabbage for the use of the sick or convalescent. It makes a delicious pickle; and is considered one of the finest anti-scorbutics in the world, doubly valuable when other vegetables are not to be had. Fresh water alone is scarce and ill-tasted; and a great annoyance arises from the clouds of fine sand which are incessantly in motion over the island. The temperature, when the Ætna was there in the month of April, did not exceed 105° in the tent; which was, however, oppressive, from the necessity of keeping it pretty well closed to prevent the sand from imbedding the instruments. A breeze generally prevailed throughout the day, except between nine and noon. The western side is by far the most cool and pleasant, but not so convenient for communicating with the ship.

The Rio Nuñez is very serpentine, and the trees on either side impede the wind in its true course. Still, however, a pleasant, and, after noon, even a fresh breeze generally favours vessels bound up, and affords favourable slants in many of the reaches down. The general depth may be stated at two and a half to three fathoms low water, with a rise and fall of about twelve feet; and although the lead generally gives mud, the anchor frequently hooks a rock, and good and long buoy-ropes are especially necessary, which should be got on board the instant the tide slacks, to be in readiness to trip the anchor in a moment if found foul. The change of tide is very rapid, and much inconvenience will be felt if completed before breaking ground.

There are three principal settlements on the Nuñez, the Walkeria, Cassasez, and Debucko; all near each other, and from seventy to eighty miles up. The first is named after the surgeon of a slave-ship, who settled here about thirty years ago. We had formed great expectations of the supplies which could be procured at these settlements, but were much disappointed. Bullocks and sheep could be procured with some difficulty: fowls were very scarce; and vegetables could not be got at all. These native towns are never prepared to meet a sudden increase of demand for food. Of rice alone they seem generally to have a superfluity. Their trade here is the same with that along the adjoining coast, but on a somewhat larger scale; and their dealings in slaves they do not affect to conceal.

About half-way up the river to Walkeria, that is, about thirty-five miles up, is a rocky barrier or dyke, of very singular formation. It presents the appearance of a basaltic formation disturbed by igneous action, the sides having a scoriaceous look; and has lifted itself through what is apparently a perfect flat of columnar basalt, but which, under the hammer, proves to be red sandstone. The dyke itself is a mixture of ferruginous sand, with coarse quartz grains and balls of a jaspery nature, forming a coarse conglomerate, exhibiting, both internally and externally, marks of fusion. It is in two pieces, with a gap about twenty-five feet between; is nearly fifty yards long by two wide; and rises perpendicularly through the disturbed stratum about eight feet; direction east and west. The disturbed stratum is a fine sandstone, with columns as perfectly prismatic as any basalt ever seen. A little to the northward is another similar formation, but comparatively undisturbed, having only a slightly arched back, presenting the appearance of a carefully paved landing-place. The columns are not above eight or nine inches diameter; and some pieces brought away were only three to four inches, by five or six long.

Below Walkeria not a single habitation was observed on the

Nuñez, though the cultivation of its banks might be profitably pursued. The want of fresh water prevents the natives settling here; but, from the nature of the soil and elevation, there can be little doubt that it would be found on digging. The principal internal trade is maintained with the Foulahs, who take in return for their goods, salt, cloth, &c. They travel in parties of twenty to forty, armed with spears, bows, and arrows, the last said to be poisoned. They are a shrewd intelligent people, very active, and are said to possess great bravery and perseverance, and to be inured to hard labour. It is they who bring down slaves to the coast; and it appears scarcely possible for British subjects to traffic with them, without becoming more or less implicated with this trade. The Foulahs travel five days (to their country from hence), at the rate of twenty miles a day, and rest two. They generally carry on their heads bales amounting to sixty pounds weight, the heaviest containing salt and beads. Their return is gold (in rings weighing from one to ten ounces each), ivory, slight manufactures of leather, pouches, rice, and fruit. The gold is obtained from alluvial hills; and iron is said also to abound in the neighbouring country; with some hot springs, but none near the settlements.

The range of the thermometer while the Ætna's boats were in the river, that is, about the end of March and beginning of April, was, at six A.M., from 75° to 84°; at noon from 84° to 94°; and at nine P.M. from 81° to 83°. The dews were slight; but at other seasons were said to be very heavy, accompanied by a fog, lasting frequently till noon.

The river is called Kakundy by the natives, and above Cassasez, two miles above Walkeria, is much interrupted by rocks of close grained basalt, several of them presenting a perfect columnar formation. At Debucko, eight miles above Cassasez, some fragments of close-grained clay-slate were also observed to be used for building, and said to be procured in the neighbourhood. Ten miles above Debucko the river is fordable, and at fifty miles merely a stream, with repeated falls. At Debucko the water is fresh at dead low water, and vessels have watered one mile above it. Alligators abound here, and some are of considerable size. It is said that they have never been known to attack any one above Walkeria; but below it the instances are numerous. Off Cassasez they were playing about the boats continually, and one came along-side, and exposing his ugly head, with distended jaws swallowed the paunch of a sheep which had just been slaughtered. Another struck the gig with considerable force.

The aborigines on the Nuñez are called Landamahs, their language being, however, nearly the same with that of the Baggas; and both still call themselves Saffres, the name they bore when Sir

John Hawkins first carried away some of them as slaves. They have a tradition that they came originally from the east. The Baggas, Baccas, Barkas (for they all differ in their pronunciation), are a peculiar tribe inhabiting the exterior Mangrove islands from Nuñez as far as the Isles de Los, and vary much in their manners, being sometimes friendly and hospitable, and often the reverse. One division of them, who occupy the island of Talabooncho, near the mouth of the Nuñez, (and of which some remarkable trees are there a principal land-mark,) are complete pirates, treacherous, cruel, and oppressive. They muster strong, with fire-arms, and seldom quit their island. Their town is close by the trees in question, which are seen to the northward of Sandy Island on entering; but they are found on all parts of the same island.

It is difficult to imagine how the Baggas exist on these exterior islands. They are in general populous, and yet do not, for the most part, contain fresh water. The consumption of palm-wine on them is great, but this cannot altogether support the inhabitants as drink. The palm-wine is the fermented juice of the head of the palm-tree; and is obtained by driving a hard peg, or boring with a gimlet into this head, or cabbage. A stream of liquor flows into a calabash suspended beneath it; and by the time it is filled (about six to eight hours), fermentation has reduced the whole into a milky-tinted, pleasant beverage; but the natives generally allow this to proceed too far, when the wine acquires a harsh, bitter flavour.

The various uses to which the palm is applied are remarkable. It is truly the 'natives' friend,'—it supplies wine, oil, fishing-lines, hats, baskets, palm-nuts, and, by taking off the head, a most excellent repast in the cabbage, which will feed a family of ten or twelve. Between the young branches, also, covering the cabbage, a fine, cotton-looking down is found, which when scraped off dries almost instantly, and forms an excellent tinder, resisting wet, and used, accordingly, to convey fire along the surface of the water, from boat to boat, when fishing. It is lit, and being thrown overboard, is picked up as it drives along. And there are other uses still to which different parts of the palm are applicable.

Sandy Island is in latitude 10° 36′ 37″ north; longitude, by chronometer, 14° 42′ 19″ west. Forty years ago it was a mere sand-bank, even at low water; subsequent deposition, however, has not only formed it into an island, at least six feet above high water, and bearing large trees, with a fair surface soil, but has also added a very extensive range of shoal on its northern, western, and south-western sides. It is said that a passage into the river once existed on its northern side, as well as on its southern, but this seems improbable, as the bottom there is rocky as well as sandy. It is remarkable generally on this coast, that wherever rocks are thus

found, sand-flats also exist, although surrounded by mud, and without any apparent source for the supply of sand. This is not strictly the case at the Nuñez, there being a red sandy cliff, in course of disintegration, on its south-east side; but the identity is even here not certain, both the colour and size of the grain being very different. Further north than Sandy Island, there is still a passage into the river for vessels drawing less than twelve feet; but it is narrow, tortuous, and appears rapidly filling up.

After passing Cape Verga, the Ætna lost the land breeze, which had previously blown with extreme regularity from about 10 P.M. till morning, and been calculated on with certainty in moving the ship along-shore. The winds also became much affected by changes in the tides and time of the moon; as, for example, if it was low water at noon, there was seldom wind enough to move the ship till the first quarter flood, and then the tide was too strong to weigh. The weather also became more hazy, so as to prevent the use of the sea-horizon; and, for the three days preceding full and change, this was so much the case, as very inconveniently to shorten the bases of the triangulation.

As former visiters, however, had held much aloof from this part of the coast, and as even the natives on the Nuñez professed to know little about it, I resolved to persevere along-shore as close and as long as circumstances and the season would permit; and found the channel less intricate, to a certain distance, than expected. We made out three mouths to the Nuñez; and ten miles north of the northernmost, much to the westward of where land was expected, saw a cluster of islands, which gradually showed their close approximation to the main; and were ascertained to form the north and west boundary of the entrance to a river, or inlet, larger at its mouth than the Nuñez; and, at twelve miles within, the distance to which we surveyed it, deeper, swifter, and promising as large or larger branches. From the transparency (comparative) of its water also, on the ebb, it appears to be either an outlet of the Rio Grande or of some other extensive drainage. Where we stopped, it came from the east, and showed several extensive arms leading to the north and west. The entrance which we ascended has two large channels equally navigable, but its mouth is so studded with shoals that, until better known, few vessels will probably venture into it; the natives north of the Nuñez having also the general reputation of being dangerous. The western entrance is equally fair and navigable to the sea. The northern alone is very shoal, and probably only passable for canoes: several of these were seen at a distance, and one country schooner; from which, and the numerous fires at night, it appears probable that the banks are well inhabited, and have some traffic. But the delineation of the coast-line was a more urgent

service for us than a further examination here, as the tornado season was rapidly approaching. The islands did not appear inhabited; the howling of wild beasts on them being incessant, and their marks plentiful.

We endeavoured to persevere, therefore, to the northward; but on pushing round the reefs to the north-west, found ourselves completely intercepted by shoals and breakers, which took their rise from the westernmost island, and, as we proceeded, formed a circular band round us, from north-east to south-east by the west. We were thus situated on the 10th of May, when visited by thick hazy weather, followed by rain, strong winds, and a heavy swell. I became convinced, therefore, that no more time was to be lost here; and, on the 13th, having caught a moment of clear weather, which showed us the line of breakers continuous from the N.W. land, round to the S.S.W., we made sail to the southward, and, by carrying a press of canvas, cleared the dangers just before dark. After which we were visited by the first tornado of the season, now decidedly set in, and experienced similar attacks, three successive nights, at the setting of the moon, when we constantly prepared for them.

During the severe service which we thus concluded, the crew of the Ætna suffered much; and scurvy appeared to enter deeply into their constitutions, giving even the least scratch a tendency to become a dangerous wound. Fish diet was found to aggravate this; and it is worthy of remark, that when our ships used to suffer so much from scurvy, stock-fish was a portion of their allowance. The only thing which appeared materially to check the disease, was beer, made of the essence of malt and hops; and I feel satisfied, that a general issue of this on the coast of Africa would be very salutary, and have the effect especially of keeping up the constitutions of men subjected to heavy labour in boats. The fresh-meat diet, which our crew obtained afterwards at the Gambia, was of much less obvious benefit than was expected.

Same Survey renewed in 1832.—My first object was now to carry our line again from Rio Nuñez to the termination of our labours last season; after which I proposed examining, at more leisure, the river then discovered. Accordingly we began our operations at Sandy Island on the 12th of February, and, on the 20th, made the rocks of Conflict Reef, precisely in the bearing given by our work last year, although our approach to them was very circuitous, involving the errors incident to at least sixty miles of triangulation by sea.

I now, then, securely moored the Ætna, and proceeded in the Raven (tender) and boats to explore the river. Having passed

over ground, as last year, varying from four to fourteen fathoms, about three miles beyond our then limit we came suddenly on a chain of reefs which nearly barred our passage, and through which it cost some time and some little damage to the boats to clear a passage. Eventually we succeeded, although I thus became satisfied that only small vessels could navigate this river without great risk. I could have warped the Ætna through, but certainly not sailed her; and I even anchored the Raven here, and prosecuted our investigations beyond in the boats alone.

Above this barrier the channel was sufficiently deep for larger vessels than the Ætna; and with only some few dangers easily avoided, being above water at half tide, and showing strong ripplings even at high water. The scenery, as we ascended, became very picturesque; and, in some spots, was even splendid for this coast, where all may be so nearly described as mud and mangrove. The land being *terra firma* in the literal sense, the shrubs were in great variety, and the banks were in many places even completely guarded by close-set clusters of the pandanus or screw pine, a tree which I have not observed in any of the other rivers, and which is not usually considered a native of Africa. Its perfume is well known; but it was now just out of flower. On our passage up we observed several groupes of natives, apparently very timid, and in a state of nature. They were, however, pretty numerous, if we might judge from the fires in every direction, and the perpetual sound of tom-toms (a kind of drum) during the night.

We had ascended about twenty miles by the evening; and, at low water, found the stream brackish, but quite fresh enough for cooking. Ten miles farther it was quite fresh at low, and at forty miles nearly so at high, water. Alligators and hippopotami were plentiful, with occasionally groups of monkeys; but we saw few birds, and these merely great fish-eagles, herons, spoonbill, and kingfisher, with occasionally doves and guinea-fowls heard and seen inland, but beyond our reach. On the second night's bivouac we found the water of the river infinitely preferable to that we had brought with us, and perfectly clear. The banks of the river had also begun to show stony landing-places, with grassy points, and but little mud. The course of the river was generally to the northward, and frequently N.W. to W.S.W.

I now began, from the even width, (of about a quarter of a mile,) to entertain hopes that this would prove a branch of the Rio Grande, if not rather the *true* river of that name, the other being merely an estuary; and though about four o'clock, on the third day, these hopes were suddenly damped by perceiving the headmost boats 'round to' simultaneously: on coming up with them, I found they had merely discovered some huts on the hill, and observed others on the opposite side of the

river. Here, then, we landed, and found several natives residing on a small eminence. One man understood English sufficiently, by the assistance of signs, to make out that we wished to know the name of the river, and immediately called it the Compoonee. After a short time he began to recover himself a little, and apparently understood more than he wished us to believe. Upon naming the sister river, Rio Nuñez, I expected confirmation of that name being the one they had given, but they did not appear to comprehend. It then occurred to me that they might know it by its native name, and the instant I had named Kā-kōōn-dĕe they understood me, adding, Dēbŭcko; and, tracing it on the ground, I put this river above it, when they immediately repeated Cōm-pōōnĕe, pointing to the water. Latterly the black I have mentioned found his tongue, and gave us to understand that he had been up the Kakoondee in a canoe to Debucko, and bought the clothes he had on (he was the only clothed person we saw) of Mr. Proctor, whom they always designate as Proggot, but that they seldom communicate with any one by water. I further learned that the king's name was Dōōk-lĭn, whose residence was a short distance from the huts; and that the river was navigable for canoes only one day (about thirty miles generally) above our position. We immediately proceeded, therefore, with the light boats to explore its extremity if possible before dark, and found the information correct as to the obstruction to larger boats, it being impossible, in our lightest gig, to pass the rocky bed of the river, which was beautifully transparent. The banks exhibited marks of a current of amazing force, at least four feet above the present level,—no doubt that of the rainy season. The roots of trees denuded by the stream, and apparently much strained in the direction of it, exhibited certain evidence of the *torrent*, which must continue for some months, as at this point the tide had lost its influence. It was indeed a pure fresh-water stream. Fish there certainly were, as I saw them leap occasionally, but we could catch none.

The village was apparently well stocked with fowls, goats, &c., houses for which were built on stakes about five feet above the ground, (like pigeon-houses,) to prevent the depredations of wild beasts. Even the goats were compelled to ascend a ladder into one of these pigeon-houses. In the centre of the area in which the huts were built, skulls, horns, bones, &c. of deer, buffalo, sheep, and wild beasts, were piled, with a few pieces of iron, evidently ship furniture, which they described as belonging to a vessel '*broken*' on the rocks outside of the river, between this and the Kā-kōōn-dĕe.

About sunset the trees displayed numbers of (wild) Guinea fowl at roost; but the closeness of the country rendered any ap-

proach to them impracticable, principally from the defences which nature has placed on the banks in the shape of the pandanus, almost impenetrable even to those well-clothed, but bidding defiance to our species at least, in a state of nature, as were the few natives who came in our way.

Buffalos, hippopotami, deer, lions, panthers, monkeys, &c., must be very numerous, as wherever we landed near mud we found the impression of their feet in every direction, quite recent, showing their visit to have immediately preceded ours, as the tide would have obliterated the impressions. Mr. Arlett, at one of his positions, found a hippopotamus amusing himself breaking the trees; but the report of a musket was merely answered by a roar; he was not inclined to make our acquaintance.

In our downward progress we met one or two groups of natives not quite so timid, and evidently wishing for a nearer acquaintance. They were fine athletic fellows, armed with swords and muskets, and with open cheerful countenances. Unfortunately the mud and a falling tide would not admit of a nearer approach, although one attempted to wade some distance through to join us. They had each a covering for the lower extremities, which was secured round the loins, and apparently formed by strips of palmetto, which gave them rather a graceful aspect, not unlike the hanging mail worn to the knee, as frequently represented on the stage in Roman costume.

About fifteen miles above the position where the Raven was left, we passed a very broad channel, leading to the northward, and very probably into the Rio Grande. Indeed, there are three great openings unexplored, but they did not apparently offer so much probability of success as that by which we ascended. My opinion is, that the whole of the space between the Nuñez and Rio Grande is one great archipelago, and navigable at high water for vessels of four or five feet draught; yet it is strange (although I saw last season a country boat under sail passing through one of these channels) that the natives on the Nuñez were ignorant of this river, or, at least, pretended to be so. It is generally believed by the most intelligent white residents, that canoes can navigate from Isles de Los to the Gambia, within the islands of this (supposed) huge archipelago, and the natives do not hesitate in affirming it to be possible; but fear, they say, prevents their passing through the hostile tribes.

In taking leave then of the Compoonee, all that can be said respecting it is, that it is a very extensive river, and has yet three arms unexplored, although I cannot possibly suppose any advantage beyond geographical knowledge to be obtained from further examination. The shoals to be passed in order to arrive at its mouth, the intricacy and danger of its navigation to Raven's Rocks,

will prevent any vessel, otherwise than for the purposes of discovery, from attempting it, for no commercial advantages are to be expected. That we have added a new river to the list on this coast, and defined the coast-line from the Nuñez to Doubtful Island (as I have named the westernmost point we attained), is certainly satisfactory.

We now then recommenced the survey with fresh energy; and as there was much sounding to be performed, and some intricacy in the examination of the reefs, I determined to ascertain, on shore, the latitude and longitude of the islot of Alcatraz.

The landing was not at all difficult, but the whole summit of the rock was covered with boobies (pelicanus sula). I directed the boat's crew to collect the eggs, which exceeded five hundred, and afforded a grateful treat to our salt-fed crew, being large, and not much inferior in quality to those of the plover. The second and third days we collected from one to two hundred; after which they declined laying more for our gratification. We had them cooked in various ways, but the most palatable was an omelet.

The customary nuisance in islands where these birds reside, was experienced here in its fullest extent; and nothing but the feeling that, in pursuit of science, every consideration of comfort must be sacrificed to attain the object, induced me to endure the almost pestiferous odour to which I was subjected for forty-eight hours. But this annoyance was trifling compared with one still more odious, viz. a species of minute blue louse, common to pelicans and other water-birds of this climate, approaching in character to the acarus, or tick, almost imperceptible, but which, inserting its head beneath the skin, added bodily irritation to the former evil.

At night the clamour of myriads of these birds, taking up their positions *en masse*, on two-thirds of a space of sixty yards diameter, defies all description. Every moment a fresh party coming in from their cruize, made directly for our lights, and occasionally coming in contact with our hands, did not neglect to give us proof of the sharpness of their bills, independent of the great nuisance of frequently placing us in darkness at a most critical moment, and bedaubing the instruments, particularly the object glass of the transit telescope. However, I felt fully repaid for my miseries; and those who shared them with me were not disposed to view them as *hardships*; in fact, I believe the change and diet were viewed rather as a *pic nic!* Wishing to procure one or two of the finest birds for skinning (without killing some useless dozen), I sallied forth with one of the 'reading off' lamps, and examined 'the host.' After their clamour had nearly subsided (about midnight), I found them all awake, closely huddled together, forming a black crown to this otherwise white islet. None attempted to

move, but, boobies as they were, foolishly stared at the light, and, without the slightest resistance or noise, suffered themselves to be handed out by the bill and examined.

Why this island has been called Alcatraz I cannot exactly comprehend, unless the Spaniards include the whole tribe (of pelicanus) under that designation. (Their alcatraz I have generally understood to be the pelican, common.) It is decidedly a volcanic production, and differs but slightly from the reefs which occur between it and the Nuñez. It is, however, of a coarser amygdaloidal trap, partaking less of the ferruginous sand, and at the base has a soft bed of steatitic clay, which hardens on exposure to the atmosphere. When I detached my specimens it readily yielded to the knife, not unlike hard soap; but in forty-eight hours was harder than chalk.

The extreme height of Alcatraz is forty feet above the sea, being nearly level on its summit, but traversed, almost down to the water-line, by fissures, which gape from one to five feet. Not a vegetable production of any kind is to be seen on it. The extreme length above is sixty yards, and one hundred at its longest base. The summit, as may be supposed from the constant visits of the boobies, has *soil*, which is about three feet deep in some places, and occasionally so far indurated as to form a porous chalky-looking stone, not much unlike some of our friable oolites of Somersetshire and Gloucestershire. Sharks and turtle are constantly in sight; the former so bold as to attack the oars, and frequently leave marks of their teeth on them; the turtle not to be caught, or we, at least, not expert enough to take them.

Alcatraz may be approached on the south-east side; but an extensive range of reefs stretches five miles off south-west (true), and about three miles in width, at right angles to this bearing. The latitude of the northern extreme of the summit is 10° 38′ 1″ N., longitude 15° 20′ 30″ W. On examining a small sand islet, capping the nearest reef to it, I discovered part of the stores and lading of a vessel, which must have been wrecked here some years ago. Her cargo apparently consisted of cam-wood and ivory, pieces of which we found almost *imbedded* amongst the rocks; even large rocks occasionally overlaid them, showing that these reefs are subject to violent convulsions from the severe south-west gales. The coppers, anchors, boom-irons, leaden hawse-pipes, &c., were perfect; but the iron was useless, excepting one fluke and shank of an anchor, which, after hammering off some *flakes* of rust, were converted into a beacon anchor. Some of the pieces of ivory also were *turned* to account by forming candlesticks for the intensity instrument, and other magnetic observations, being free from attraction. The cam-wood had been freely tasted by the teredo, and was of no value.

Having completed our work here, we slowly crept to the northward, towards the inhabited islands; and at length, on the 6th of April, much to our relief, trees were again visible, and promised some variety from our late monotonous labours. After completing the ground about Pullam, Honey, and Yomber Islands, I carried the Ætna through the channel, which, although intricate, is *safe* for vessels of *any* size, assisted by the chart and their boats, as the tide (which however is not so rapid as in the great channel) shows by its rippling, where the boats may anchor to mark the channel should any doubt otherwise exist. The best time for entering the channel is at the last quarter ebb, when the dangers are mostly visible. The Raven was worked through to the eastward of Yomber; but no vessel should attempt that passage unless on a similar duty.

Being at length in the immediate neighbourhood of inhabited islands, I considered myself certain of supplies of fresh meat and vegetables, but was doomed to be sadly disappointed. After landing, going to their towns (inland), and using every effort we could suggest to induce the natives to sell their bullocks, we found it no avail. They would listen to nothing but 'arma y polvere.' These we could not spare; and to add to our chagrin, found herds of the finest bullocks I have seen on the African coast, crowding the beach at our embarkation, no doubt driven down in the expectation of sale; their owners, too, evidently disappointed. I made a second effort at another town to the northward, in what I have called Dămăcōn Bay (this being the king's name, and his majesty visited the ship with the chiefs, while we wooded and watered); but was here equally unsuccessful. We procured some few fowls, two goats, and bananas, for tobacco and buttons, but nothing more. Never have I witnessed more general disappointment on both sides: all the officers were on shore, endeavouring by various means to effect the purchase of bullocks or vegetables, but without the slightest chance of success;—the universal answer was, 'Arma, arma.'

These people are well described in Captain Beaver's work; and the same ceremonies he alludes to, previous to entering into their town or trafficking with strangers, viz. the presentation of a cock, and drinking palm-wine, &c., was observed towards me; (although the cock, in my case, was black).

At Dămăcōn Bay (Kanyabac) water may easily be obtained, and in any quantity; but I should much doubt its salubrity before passing the filtering machine, boiling, or other purification. The place where it is obtained is a pond or reservoir, which runs parallel to the beach, and then inland amongst the trees, where wells may be dug and very clear water obtained. But this reservoir (although supplied from a spring as fast as it oozes

through the sand into the sea) is so constantly filled with fallen leaves that the perpetual vegetable decomposition must render it of very doubtful character. It is preferable, however, to that procured at the Gambia or Goree; and, when drawn at the spring, (where it rises under a natural bower,) it was pure as crystal, and excellent. I have not the slightest doubt that, were casks sunk and allowed to remain quiet for twenty-four hours, most excellent water could be obtained, as it would rise within six inches of the level of the ground. At this spot we also wooded with great facility.

The soil of the island appears to be excellent, composed chiefly of decomposed lava and vegetable matter. Vegetation is luxuriant, and the natives seem inclined (or are probably impelled by necessity) to make the most of it. Our visit happened in the dry season, therefore under every disadvantage; yet to judge from the condition of the herds of cattle constantly parading the beach, they found abundant nourishment. They were invariably in the finest condition, of moderate (rather small) size, and the best proportioned beasts I have seen on the coast. Some wanted horns, which is not usual in the breed of the coast.

During our visits, which did not bring us together above twelve or fourteen hours in all, I did not perceive the natives touch animal food or vegetables of their own produce. The couscous and palm-nut, pounded into a cream, were prepared by the women, and not without some labour. The males (excepting children under three) ate from a separate dish, and the women by themselves. The only labour I observed the men take upon themselves was climbing the palms to set their calabashes, and bring away the palm wine; and, in fact, the women performed all the laborious duties of the household, the men attending to hunting, fishing, and not unfrequently marauding, when they can find their way across to the main. They are not particularly partial to Bulama; and the name of Beaver (whom they style Bĕbĕrĕ) very nearly produced some disturbance with a chief, a relation of the king, whose father, he intimated, was killed by Captain B. himself. The assistant surgeon, hearing them talk of Bulama, had simply asked if they recollected the name of Beaver. The chief in question had then just landed from the ship after copious libations of rum, and perceiving, at the instant, a small boat's union hoisted, as a mark for the watering-place, possibly associated it with the idea that we intended to take possession of their island. However, after a little blustering, his displeasure took an opposite direction, and he quarrelled with his own companions. The affair terminated in our having his authority, as chief of the district, to do what we pleased,—wood, water, &c., of which at first there appeared some doubt; and none of the chiefs interfered, or appeared on the beach afterwards.

The men are generally furnished with a musket, knife-dagger, (answering both purposes,) spear, and, in a few instances, a sword, in most gorgeous hangings, as far as brass nails and bits of red cloth can go. The muskets I examined, suspecting they were more for show than use; but they were invariably loaded, ready for service,—the charge being, in some cases, bits of iron beaten into slugs, in others about an inch of iron plug, evidently cut from a bar of nearly the bore of the musket. This is intended for the elephant, which, by their gestures and a molar tooth they produced, appears to reside here. The hippopotamus I saw off the S.W. end of the island, and much larger than I have seen in the rivers;—he appeared to have barnacles attached to him. It has been considered doubtful whether these animals frequent salt water at any distance from the mouths of fresh-water rivers; but here is proof of the fact, for nowhere within many miles is a fresh-water river to be found. The Rio Grande will not afford one, and the Componee will perhaps be the nearest.

Most of the muskets were British, some few French and Spanish; and, from experiments which we made on the beach, at a mark about forty yards' distant, these natives are good marksmen. None put the ball more than six inches from the spot, and several in it. In taking their aim, they go down on the right knee, with the left foot advanced, and continue sliding the left hand outwards along the barrel until the arm is entirely extended. Every faculty seems absorbed in the act; and I much doubt, were they pushed in action, if one out of fifty could hit his mark unless he could take time for deliberate aim. Our rapid aim, and killing flying, puzzled them.

These people are generally designated as 'warlike and treacherous.' However, being constantly on our guard, and frequently armed, (visibly as well as invisibly,) it perhaps did not suit their views to display any hostile feeling towards us, although I believe they were prepared to resent any insult which might have been offered them. With the natives of Orango I had but one interview, and that did not offer any inducement to repeat it. They appeared to be a more lively, but, at the same time, more barbarous race than those of Kanyabac; and, to our questions and signs relative to bullocks, returned the same answer.

The whole of these islands are of volcanic origin;—Yomber, Honey, and Cavalho are at times inhabited, but Pullam not. On all, except Orango, vegetation appears to be luxuriant; but the extreme sandy nature of the soil of Orango renders this impossible.

At Cavalho I turned the ship's company on shore to wash and amuse themselves, as well as to derive benefit from a species of plum which abounds there, probably antiscorbutic. The seine was hauled with success; and from the abundance of cavalho

taken, I suspect this island derives its name from them. Fish are abundant throughout these islands, but rocks quite as much so. Indeed here, and at the bay in Kanyabac, were the only two favourable spots for hauling the seine with success. The porgy was frequently taken by hook from the ship. The northern end of Cavalho lies in latitude 11° 1′ 30″ N., longitude 15° 41′ 15″ W. (by the triangulation). Its extent is one mile N.N.W. and S.S.E., and half a mile in width. It cannot be approached with safety within one mile at any point, frequently three. Nothing larger than a boat drawing eight to ten inches can pass freely between it and Honey Island at low water, and then only when the sea is smooth, as the whole space occupied by the islands of Pullam, Honey, and Cavalho, and three miles to the westward, is replete with danger for vessels. Three miles north in the meridian of Cavalho it breaks at low water, and from thence, by a wide curve, to six miles south-west of Pullam, should not be approached. The depth decreases suddenly from 24, 15, 6, (fathoms) on shore. Indeed, wherever the greatest depths occur (that is above 15), there is danger near.

I observe in the translation of Baron Roussin's Memoir, that (speaking of Kanyabac) the trees called Pullam-trees in the country, are 'Pullam-trees,'—'palm-trees.' I am surprised at this mistake, as it is well known that the Pullam-tree, connected too with the pagan superstitions of the natives, is the bombax, or silk cotton, and has no reference to the palm. Indeed, Pullam Island, which is shortly after described as deriving its name from the 'large trees with which it is covered,' can hardly boast half a dozen palms, which hide their diminished heads beside the more majestic Pullam-trees.

On Pullam Island, where I found landing good, I collected some roots which grew very abundantly. They have a very acrid taste, and deprived one of my boat's crew (from sore tongue, having been foolish enough to taste it) of his speech for half an hour; and, possibly, some such incident as this, though more serious, was the origin of its having been formerly named Poison Island, as appears on the old charts. The plant has a lily stem and flower, and is shaped something like a turnip; another has the bulbous root of the lily. Some of these were preserved; but they had already commenced their shoots, anticipating the rainy season.

The south end of Pullam lies in latitude 10° 51′ 53″ north, longitude 15° 43′ 5″ west; but the shoals extend from the extreme south-west, four miles and three quarters, and the five-fathom line seven miles.

The Gambia, considered in a mercantile point of view, and as regards supplies, appears to me to offer more decided advantages than any of our possessions on the coast of Africa; and may, indeed, be said to be the only point where anything approaching to trade can be satisfactorily pursued. Even in its present state it is by far the most healthy part of the coast; and, had a portion of the liberality of government to Sierra Leone been extended to Bathurst and its dependencies, I feel satisfied that, long ere this, it would have acquired that character which eventually, with infinite labour, it will establish for itself from its own resources. What it chiefly wants, on the score of health, is the effectual drainage of the island, which, unfortunately, as fast as an approach is made to it, is destroyed by the sea, because the means employed are just below the scale which would complete the work. But even as it is, the constitutions of the residents appear to me as sound as in any part of the world, and the strongest has been here thirty years without visiting Europe. Sir Charles M'Carthy himself, with whom Sierra Leone was an absolute hobby, admitted the Gambia to be the place for invalids.

The trade of the Gambia I also consider more likely to be speedily improved than that of any other point of this coast. The merchants have formed themselves into a company, with 6000*l.* capital, to examine, and further their interests on the banks of the river above Pisania; and, at the period of our departure, were just setting forth on their first expedition. The Foulahs, it is said, on their way to the Rio Grande and Nuñez, pass the head of the Gambia; and if their objects in trading to these rivers can be equally or better effected by coming to the Gambia, there can be no doubt that they will be easily diverted from them. The supply of slaves in these markets may be thus also eventually cut off; for the Foulahs are said not to be anxious to part with their slaves, but quite the contrary, if they could otherwise procure their supplies. And the specimens of the productions of the banks of the river itself, which I examined, were of good marketable quality, not first-rate, but the best seldom come up first, and experience is requisite here as elsewhere. The following appears to have been the export trade of the Gambia last year, as collected from merchants and others conversant with its transactions; but it was hastily compiled, and is believed not to be quite complete; and many other products were sent as samples, which await a report.

Exported in 1830.

242 tons yellow bees-wax. 100*l.* per ton.
2½ ditto white ditto. 135*l.* per ton.
502 loads African teak. 3*l.* 10*s.* per load.
54 tons Cam wood. 12*l.* per ton.
14,625 lbs. ivory. 3*s.* 6*d.* per lb.

1711 Bourdeaux (=60 gallons) of corn. 4 dols.=17*s.* 4*d.* per bourd.
2714 ditto of lime. 2*s.* per bourd.
76,471 hides. 5*d.* per lb.
500 oz. African gold. 80*s.* per oz. (Merchants have shipped infinitely beyond this, but secretly, fearing piratical vessels on the coast.)
196 lbs. ginger. 1*s.* per lb.
52 cwt. gum-arabic. 75*l.* per ton.
82 tons African rice. 12*l.* ditto.
82 ditto Gambia ditto. 14*l.* ditto.
3443 gallons palm-oil. 2*s.* per gallon.
12 pieces of caoutchouc (a sample).
688 ship timbers. 5*s.* each.
9 horses entered. From 10*l.* to 100*l.* (N.B. A great number are shipped, without entry, for Sierra Leone, Cape de Verd, &c.)
— feathers and shells.
2 boxes tortoise-shell. 30*s.* per lb.
1140 country cloths and paguis. From half a dollar to 40.
207 bullocks (for West Indies). 6 to 16 dollars a head.
14 tiger skins. 5 to 10 dollars.
700 country mats and baskets. 5*s.* per dozen.
100 baskets of ground nuts. Half a dollar per basket.
225 bullocks' horns. 7 dollars per 100.
1476 lbs. anchilla. 10*l.* per cwt.

The following articles are also in the market, but were not among the exports last year.

Mahogany. Of various kinds, at 4*l.* currency, = 3*l.* 9*s.* 4*d.* sterling. (Exchange dollar at 4*s.* 4*d.*)
Ebony. Of very good quality, grows abundantly in Salum river, and partially in Gambia. (Not searched for much.)
Various kinds of mangrove.
A kind of box.
A very hard and durable wood, called dittach, stands well under water, and used in the construction of vessels, wharfs, &c.
Toulacoula, or bitter oil. 3*s.* 6*d.* (currency) per gallon.
Cotton. Nominal or barter price, in the rough, 2*d.* per lb.
Indigo. In the rough cake, 2*s.* 6*d.* each.
Hemp, made into ropes or cords, and sold at about 6*d.* each.
Potash. About 5*d.* per lb.
Honey. Retailed in Mandingo country at 2*s.* 6*d.* per gallon.
Butter, same price as honey. (N.B. The natives preserve the butter by a process of melting, and retail it in the liquid state at 2*s.* 6*d.* per gallon.)
Cola nut. 3*s.* 9*d.* per 100.
Cardamums. Sold in barter, among the natives, at about 10*s.* the lb., and brought from a distance in the interior by the gold merchants.
Goat, calf, and bullocks' skins, dressed by the natives, but usually made into articles of use. (The natives dress these skins well by means of potash and banna seeds.)

Cayenne pepper, of all kinds, in plenty.
Beef (good, if *demanded* good), at 3*d.* (sterling) per lb.
Fowls. 1 to 1¼ dollars per dozen. (Customary to charge strangers 2 dollars.)
Very good ducks. 4 dollars per dozen.
Mutton. Dear; generally private property, seldom in market.
Goats. 1 dollar to 1½ (with one or more kids).
Wines (bad season), indifferent. Claret, 5 dollars the case.
Tea. 2 dollars the lb.
Dried oysters (good).
Eggs. 14 to 16 for quarter dollar.
Nuts (ground). Half-dollar per basket.

At the season we visited the Gambia (the very termination of the dry), vegetables were hardly to be procured, and those only pumpkins. There is little inducement to cultivate more of them than is required for the consumption of the inhabitants, as during the year seldom more than one vessel of war visits the port, and then merely for a few days. And the merchant shipping are mostly navigated by natives, who care little about them; the masters, if white, residing with their owners or consignees during their stay.

Watering is, perhaps, the worst point about Bathurst. The only water to be obtained is from private wells, and by close work (in the dry season) as much as five tons per day may be obtained. This was the utmost we could manage, working night and day; and after all, it was of doubtful quality, and used by us only for cooking. Merchant vessels, however, go to Jilipe for *worse.*

Wood is to be obtained at the beach, well dried, in convenient lengths for stowage, at six shillings sterling per chord (one and a half dollars). This, taking all circumstances into consideration, is cheap; besides the saving of boats, moving ship, and exhaustion of crew, not to omit the introduction of vermin, &c. on green or moist wood.

The tides about Cape Blanco are irregular, and much influenced by the land near which they run. High water at full and change may be looked for about noon; the greatest rise, under every advantage*, does not exceed six feet. Southward of the parallel of the Cape the indraught has a velocity of 2.6, and the offset or ebb the same. Eastward of the meridian of the Cape the tide bends northerly, and at three miles chord its velocity appears from south-west to north-east, about 2¼, following the circular course into Greyhound Bay. North of the parallel of the Cape the ebb sets north and floods south, and close in shore the tide is considerably weaker than at three miles, where its greatest influence may be expected.

* Springs and winds.

The Spanish fishermen do not appear to resort much to the eastward of the Cape. I watched the motions of four schooners and their boats, and their practice appeared to be as follows:—

Their anchorage is in a bay about three miles north of Cape Blanco, in seven or eight fathoms, where they are quite sheltered from N.N.W. to S.S.E., and when the boats inside the Cape could not work, and the anchorage there was not only unsafe but unpleasant, here they enjoyed still water. About midnight they got under-way, and worked to the northward, continuing fishing under sail until four or five in the afternoon, when they resumed their anchorage. Each vessel sent a boat round the Cape, which appeared, however, merely to stand three miles to the eastward, and then return under sail. Two of them visited the Ætna; and I had about half an hour's conversation with the whole party (sixteen), giving them a dram each, and some tobacco, to induce them to loose their tongues. They all appeared to be superior to the common run of Spanish fishermen, and their language was more refined than one would expect from the Grand Canary. I endeavoured to ascertain if they ever ventured deep into the bay, or as far as the opposite shore; but their reply was, that the weather was always too rough, and nothing was to be attained. This question I put to several, particularly the youngsters, who appeared anxious to communicate all they knew; but all their answers on every subject were so straightforward and open, that I do not believe in any report of their establishments on this coast. One, and the overwhelming argument, which appears to me to set the matter nearly at rest (unless, indeed, the country be strangely different from the peninsula), is, that should they attempt to build house, fort, hut, or any thing stationary on these shores, one month's weather, of the nature we experienced, would bury it in sand. If the house or fort stood, I much doubt if any consideration would induce other than a Moor, who is semi-brute, to endure such an existence as must of necessity follow. The very atmosphere is sand; and the habitations of the Moors who frequent this place are merely formed by stones three or four feet high (tabular sandstone), sheltering the north-east and west sides from the sands, over which they spread a skin and creep in. (This I give, however, from inference. The Spaniards said they covered themselves with a skin; and we found huts formed in this manner in many places.)

They appeared anxious to get us outside amongst them, and were rather disappointed when they found that they would have left the coast before that would take place, as they proposed returning to the Grand Canary in four days. They assured me that the present specimen of the weather might be taken for that of the whole year, and that very few vessels attempted to remain on

the eastern side. When informed of my object, I narrowly watched their countenances, but saw nothing indicative of alarm, rather of pleasure. "I told them it was my intention to investigate every creek in the great bay, and made inquiry as to the reception I should meet from the Moors. They said, 'They are not afraid of us, but they are of the English. They have only long knives, and one or two pistols, but no muskets.' I told them I had information, and *positive*, that they had muskets; but they assured me no; and that they were hard pushed for a charge for the pistols. They appeared very grateful for the rum and tobacco I gave them, and anxious to give something in return, offering hooks, lines, and fish. They informed me that their usual fishing ground is in twenty-five fathoms, where they take fish from eight to sixty pounds, and that their average daily work is about three hundred weight in the boats. Their schooners have polacca foremasts, and when fishing they furl all the square sails in one. They appear rakish-looking vessels, and any thing but badly found. Their tonnage may be from one hundred to one hundred and fifty. I am surprised that no other nation has taken advantage of this trade. It appears to be the most economical fishery I have witnessed, and the climate one of the finest. I suspect the pirates have occasionally visited them, as they spoke with rather a significant look when they mentioned a visit from a vessel under Columbian colours. French, English, and Portuguese, have occasionally touched here and purchased their whole cargoes. The fish we met with are as follows:—Porgy, mullet of several kinds, rock cod, and red-snapper; but I have not met with soles beyond six inches in length, although I tried with the trawl. The red-snapper is what I suspect is termed bream in the old voyages.

In reply to a question, whether fresh water was to be obtained, they shrugged their shoulders, and said, 'Yes, but only fit for the Moors.' This is some distance north of their anchorage, and, therefore, will be four or five miles north of the Cape.

Some animals, of the cat tribe, having a foot about the size of a panther, with a smaller of the jackall size, appear to be plentiful about Cape Blanco, as their footmarks were found along every part of the coast that we examined; but none were seen or heard, although they must have passed our tent pretty close every night. Their marks were always fresh in the morning, as the heavy dew which falls here causes the sand to lie quiet until the sun has dried the surface. The drift-sand varies in grain from the size of hemp-seed to almost an impalpable powder, searching the nostrils, lungs, and ears. I found the small grains, equal to dust-shot, almost insupportable; but what must a gale with hemp-seed size prove? The rocks bear witness of the force of attrition on the superior surface, being in some places completely smoothed down. The bank of Arguin must, from the clouds blown off,

be constantly accumulating, and the disintegration of the cliffs is hourly altering the outlines.

The surface on the summit of the cliffs in this bay is, I may venture to say, bare, or nearly so, of vegetation. The only stray plants and bushes to be met with belong to the family of salicornia, specimens of which I have preserved. Some of the roots and stumps, dried, may, with other fuel, assist in supporting a fire; but they will not burn alone. On the low sandy point, under East Cape, some few scraps of fir and oak were found washed up by the sea, but barely sufficient, with fire already obtained, to kindle the before-mentioned stumps of the salicornia. The rough, rugged, stony elevations, had some few traces of lichens on their northern faces, where the sand does not lodge; and this comprehends every thing vegetable. The sea occasionally throws up that species of fucus known by the name of dulse, but very sparingly. Mussels and other shell-fish are very abundant at low water, and this I believe is the only food nature here presents for man, deprived of other resources.

Amongst the objects collected by the dredge two only are worthy of notice, and I suspect are entirely new. One is a murex, the other a nucula, both beautiful of their kind, and likely to prove of interest to naturalists, particularly the former. The bay must abound with a great variety, but no time could be spared for this service.

In a geological point of view this peninsula differs widely from what I had been led to expect (viz. an entirely siliceous formation). I examined the whole extent (as far as the northern point of Repose Bay), a distance of thirteen miles; and it is a mixture of calcareous and siliceous sandstone, approaching our coral rag, or grit, in lines of stratification dipping southerly, in various inclinations as high as 45°.

It appears to be of three kinds, and each will be found at the cliffs, throughout this extent. The lowest stratum, which is the water-line, and forms the rocks under water, in the bay and outside as deep as fifteen fathoms, is a close-grained gritstone, with three-fifth parts siliceous. This is succeeded, nearly at the high water level, by one somewhat softer and more calcareous, in which the recent pholas is very abundant. This stratum is about eight to ten feet in thickness, and the cleavage, or lines of stratification, about 30° dip southerly. The bed above this is of a softer nature, apparently the debris of animal and vegetable matter in calcareous sand, on the lower edges of which, in contact with the lower stratum (occasionally spread through its own mass), numerous fossil helices occur. In this mass, not having any lines of division, are many cavities, from which a fine powder, mealy and entirely calcareous, was raked out, by which I am led to

conclude that they contained organic remains, which decomposed on the admission of the atmosphere. The holes at their edges had much the appearance of those in cheese where the mites are tumbling out. Above this bed, two others, varying each from four to six feet of grit, are imposed, the inferior lines of division or cleavage at an angle of 30 to 40, and the superior at 45. This is again capped by the superstratum, a loose, rubbly, calcareous sandstone, with slight admixture of silex. The lines of division, in all the stratified beds, I found to arise from layers of quartz sand, which cause it to cohere very slightly, and the result is a constant disintegration of the whole line of coast. From some fragments exposed on the hills, it appears to harden considerably on exposure, if not affected by sea-water; and in some detached portions I have found lumps of entirely quartz sand, so compact as to ring like clink-stone. The summit of this peninsula is composed of lines of sand hills and rocky eminences, just what one would expect to find if the sea were to quit its position, and show us the beds over which it flows. In every position, where a bush, or rocky islet, is prominent, there, on its southern side, you will surely find its sand-hill,—a proof of the prevalent winds, as well as an admirable model of the formation of shoals, &c. under water, and pointing out most perfectly the ' steep to ' approaches to banks past which rapid streams or currents flow, with their concomitant shallow tail, formed by dead water or eddies.

With the exception of these newly-formed and forming sand-hills, the whole surface is covered, in a most extraordinary manner, with shells, of all dimensions, and of the species generally found in their recent state in the bay.

To suppose that these immense beds, covering (as far only as I have examined) a space of thirteen miles, were collected by natives, who but seldom, and then only few at a time, visit this spot, is beyond probability. Yet they are loose, and in no instance have I found them imbedded in the stone. The helix I have found in its living state, attached to plants, but they do not resemble either the loose shells of the surface, or those imbedded in the lower strata. That the sea should have lifted her waves over heights of sixty to eighty feet is also improbable. Yet there they are, and the strongest argument against their being brought there for food for bird or man, is their generally perfect state. Had they been used for food, the shells would have been broken or burned, to extract the fish of the univalves, but they are perfect, even to their finest edges. The whole formation bears some resemblance to Bermuda, with the exception of the mixture of silex. The lines of stratification would favour its submarine formation, and the constant lines of deeply-inclined southerly dip particularly so. It is decidedly of four different characters,

and here and there we meet a wedge-shaped deposit, forming by itself a bed, of three to four feet thick in the middle, tapering north and south, but its base always straight, resting on one of the harder formations. In some parts, the coast presents a perfect flat of rock, which has a most remarkable appearance. I had at first viewed it from a height of fifty feet above it, and mistaken it for sand, recently washed by the sea; yet its height was too great for such an admission. Upon examination, I found this appearance to proceed from the surface of highly-inclined strata, dipping southerly, and worn smooth by the force of attrition of the sand passing to the southward. It exhibited long wavy lines, of various shades, like the agate-looking limestone of Gibraltar, or stalagmite, and extended more than a mile.

Cape Blanco, by the mean of our observations, is in 20° 46′ 26″ north latitude, and 17° 4′ 10″ west longitude. The mean dip, with the axis correct, was 57° 27′ 4″; inverted, 57° 1′. The table (in the following page) will show the temperatures, prevailing winds, &c. &c. at all the ports visited by the Ætna, in 1830, 1831, 1832.

On the 14th of June, 1830, we were becalmed in lat. 15° 27′ 9″ north, and lon. 17° 31′ 50″, and I availed myself of the opportunity to make a few experiments on the currents, temperatures, &c.

Two boats were lowered, and, by the lightest,—a gig which two men could lift,—the water-bottle and thermometer were sent down. The boat was allowed to ride fifteen minutes, until the line became perpendicular, with 545 fathoms, for which I allow 540 fathoms. Had the current been tried before that period, the result would have given three or four knots; but when the action of the line, to regain the perpendicular, ceased, I found it to set south (true) 0,75 per hour.

I now caused three baréças to be slung, (with lines and deep-sea leads attached,) and simultaneously let go from the gig, still riding by the line of 545 fathoms. No. 1 had 40 fathoms; No. 2, 20; No. 3, 10; and, during an interval of three minutes' drift, it was found that No. 1 had gained 1 fathom of No. 2, and No. 3 had gained 3 fathoms of No. 1; showing that the current ran at 40 fathoms with nearly the same velocity as at 10 fathoms, and that the rate of the whole differed little from that of the surface. The temperature, at 540 fathoms, was 43°, at the surface 81°, of the air 83°; but one fact struck me as deserving remark, *viz.* that although all the baréças started from the same point, when taken up they had diverged 50 feet from each other.

Temperatures, prevailing Winds, &c. at all the Ports visited by the Ætna in 1830, 1831, 1832.

PLACE.	Date.	TEMPERATURE. Air in Shade. Min.	Air in Shade. Max.	Air in Shade. Mean.	Sea Surface. Min.	Sea Surface. Max.	Sea Surface. Mean.	Prevailing Winds.	Commencement of Tornadoes, Rains, &c.
Madeira	8 to 12 Nov. 1830.	65°	74	68.3	67	75	70.6	S.W.	Indications of bad weather about June;—the tornadoes expected the end of that month.—N.B. Experienced them off Senegal June 15, 16, and 17, 1831.
Teneriffe	18 to 20 Nov.	65	73	69.4	70	74	72.2	Easterly.	
Goree	27 Nov. to 7 Dec.	71	83	75.8	72	80	75.1	N. Easterly.	
Revisited	10 to 12 June, 1831	73	78	75.1	71	77	74.1	Northerly.	
Gambia	9 to 11 Dec. 1830	71	83	77.2	73	79	76.4	N. and Easterly.	During season of Harmattan,—rainy season just terminated, 9th Dec. on which occasion the colours are hoisted and a gun fired. Second visit in May and June, 1831;—end of dry season;—symptoms of approaching rains,—squalls, with rain about 1st of June, 1831.
Revisited	23 May to 6 June 1831	70	80	75.0	72	82	76.8	N.W.	
Sierra Leone	17 to 21 Dec. 1830	78	86	80.5	78	84	81.4	W.	Experienced slight tornado and rains,—termination of rainy season.
Isles de Los	25 to 31 Dec.	79	86	81.7	80	84	82.3	N.W.	Rainy season commences in April,—ends in December.
Between Isle de Los and R. Pongas	January, 1831	78	90	82.6	80	85	82.8	Land & sea breezes	The rainy season between Gambia and Isles de Los ranges between the 1st of April and 1st of June, commencement; — 1st to 31st December, termination. Off Conflict Reef and Bijoogas, 12th, 13th, 14th, 15th May, 1831, experienced rains and tornadoes.
Between R. Pongas and Cape Verga	February	76	90	80.6	78	85	82.7	"	
Cape Verga and R. Nuñez	5 to 22 March	76	87	80.8	76	87	81.5	"	
Entrance to R. Nuñez	23 March to 12 Ap.	77	87	81.1	78	85	82.0	"	
R. Nuñez and Conflict Reef	13 April to 13 May	76	85	80.5	79	86	81.6	N.W., & occasionally land and sea, but irregular.	
Off Bijooga Islands	6 April to 19 May, 1832	69	89	78.1	68	89	77.6	N.W., west;—seldom variable, or off the land.	No tornado up to the 19th May, but many threatening indications.
Cape Blanco	24 June to 12 July	64	75	68.6	64	76	67.6	N., N.N.E., N.E.	Spaniards affirm that there is no rainy season here, but strong north and north-easterly winds the whole year.

V.—*Failure of another Expedition to Explore the Interior of Africa.* From Original Documents in the Office of the Royal Geographical Society.

In December, 1831, two gentlemen, Messrs. Coulthurst and Tyrwhitt, were introduced to the Council of this Society as being about to proceed, at their own expense, to the mouth of the Quorra, with the view of endeavouring to penetrate thence eastward to the Bahr-Abiad; and although their preparations were not on such a scale as to warrant any very sanguine hopes of success, it was felt to be a duty, on the part of the Society, to patronize so spirited an undertaking. They were accordingly placed in communication with Colonel Leake, and other members of the late African Association, whose advice, it was thought, could not fail to be of service to them. They were also introduced to Captain Owen, R.N. and Mr. Lander, the value of whose experience, in planning their operations, was obvious. And the expedition being brought under the notice of his Majesty's Government, (through the medium of two members of the Council,) the loan of a chronometer was obtained for it; with strong letters of introduction and recommendation of both gentlemen, to the officers commanding the Naval and Military forces of the Crown along the African coast.

The party sailed from the Downs on the 1st of January of the present year, and arrived at Bathurst, St. Mary's, in the Gambia, on the 28th of the same month. Both travellers were somewhat indisposed during the voyage; and the sun, after their arrival, so seriously affected Mr. Tyrwhitt, (who was scarcely more than twenty years of age,) that he here yielded to the repeated representations of his companion and others, and returned home. Mr. Coulthurst himself proceeded; but experiencing some delay in proceeding from the Gambia to Fernando Po, he proposed at one time to change his route at this point, and to penetrate, in the steps of Mungo Park, from the Gambia to the Djoliba, and thence to Timbuctoo and Funda, in prosecution of his ulterior object; being further tempted to this deviation by the prospect of being able to accompany a trading party then fitting out at Bathurst, which was destined to ascend the Gambia as far as might be practicable in canoes, thence to establish a regular communication by coffilah with the nearest point of the Djoliba*,—and which undertook to escort him as far

* This expedition seems to be a part of the operations of the company mentioned by Captain Belcher (p. 296), of which the following more detailed account has been obtained from the Colonial Office:—

'In the month of May, 1831, most of the merchants at Bathurst formed themselves into an association (with a capital of 5000*l.*) for the purpose of trading to the

as Seguin.' The St. George, however, being ready to sail for Fernando Po before the arrangements on this line were completed, he ultimately reverted to his original plan; and the following correspondence will best exhibit his further proceedings.

Colonel Nicolls (Fernando Po) to R. W. Hay, Esq., Under Secretary of State for the Colonies.

'Fernando Po, March 29th, 1832.

'SIR,—I have the honour to acknowledge the receipt of your letter of the 10th and 22d of December, relative to Mr. Coulthurst. Being on the best possible terms with Duke Ephraim, and the opposite chiefs in my neighbourhood, I have taken all possible steps to ensure a good reception to Mr. Coulthurst. I sent him over as soon as I could; and the two letters herewith inclosed from Duke Ephraim and himself, will show you how well he has been received.

'Since their receipt Mr. Becroft went over, with the view of making the best terms he could for Mr. Coulthurst, in which he has succeeded with his usual zeal and ability.

'The whole of Mr. Coulthurst's expenses, including the hire of an Eboe man, who is to accompany him all through his travels, and of a large canoe and her crew, which are to go beyond the Eboe country with him, will not amount to more

source of the river Gambia, or as high up as should be found practicable. They assumed the appellation of the "Tandah Company," from Tandah, the name of the country highest up the river of which they had any authentic information; the principal trading port of which, called Tenda-Conda in the chart, is stated to be several "tides" above the Falls of Barraconda.

'Tandah and the neighbouring states are very productive in wax, hides, and ivory; and contain, it is said, some mines of gold. The people, who are of a mild disposition, have shown much inclination to trade; but, through the intervention of the Woolli tribe, have hitherto been prevented from reaching the British factories.

'The object of the merchants is, in the first place, to effect a firm footing in the Tandah country, where they hope to draw a considerable gum trade from the neighbouring states; and then, by degrees, to attract the traders from Bambaak, Kaarta, Bambarra, Bourree, Koukan, Footah-Jallon, and the intermediate countries, to all of which Tandah is a central point.

'The lieutenant-governor thinks that the extent to which the merchants may be thus able to open an intercourse with the interior of Africa, can hardly be estimated if the company should form caravans of the discharged soldiers on the coast, many of whom are natives of those countries, and who could join with the merchants and trade in coffilahs between the Gambia and Sego, Bourree, Timbuctoo, &c. He therefore applied for the permission of the Secretary of State to incur a small expenditure in exploring the river with the colonial schooner and canoes; and expressed an intention of performing this service in person. Lord Goderich approved of this expedition, and the lieutenant-governor has only been prevented from as yet effecting his object by the recent hostilities in which he has been engaged with the King of Barra.'

than 70*l.*; for which he has given the Duke a bill on his father, which Mr. Becroft and myself have negociated at our own private risk, as you ordered me not to subject the public to any expense in forwarding his views.

'I have, &c.

(Signed) 'EDWARD NICOLLS.'

Duke Ephraim to Colonel Nicolls.

Old Calabar, March 16th, 1832.

'MY dear Friend Colonel Nicolls,—Your letter came safe to hand on the 15th instant, and I am happy to hear you are well. The gentleman you sent in the schooner I have arranged with to send him in one of my large canoes as far as the Eboe country, which is as far as my authority extends; but I have no doubt but that I shall be able to procure him another guide from the chief of the Eboe country to pass him on to the next territory in safety, and so to continue it. At the same time it must be understood that it will be attended with a great deal of trouble and expense, which I hope he will not refuse to defray in all cases.

'I am sorry to say that I detained the schooner one day longer than was expected, on account of Calabar Sunday.

'I remain, &c.,

(Signed) 'DUKE CALABAR,

'King of Old Calabar, &c.'

Mr. Coulthurst to Colonel Nicolls.

'Henshawe, Duke's Old Calabar, Friday.

'DEAR SIR,—In returning my sincere thanks for the kindness I experienced at your hands in Fernando Po, I must also include the very obliging reception your recommendation obtained me from Duke Ephraim, who tells me he has plenty of Eboe people whom he can send with me, and I need not therefore trouble Captain Becroft to bring William Dore with him. Owing to our not arriving till the morning of yesterday, the Calabar Sunday, when one cannot get the people to do any work of moment, I did not even receive a definite answer from the Duke till to day. . . . Most of the mechanics here are natives of the Eboe country; and I really trust the difficulties attending that route, the direct line to Funda, are more ideal than otherwise, with the exception that I must necessarily expect to see a considerable portion of my goods melted down amongst the different native chiefs amongst whom the country is divided; and I suspect it was owing to the

want of any regular recommendation, more than anything else, that the Landers were seized and detained till ransomed. Now the Duke having constant commercial intercourse through the Enyong country, with the adjacent districts of the Eboes, his name will, at least, afford me a protection, perhaps beyond even the extent of his own personal knowledge. I told him how the king of Funda had been enabled, by means of the European musketry which had reached him from the coast, to make head against, and drive back Sultan Bello and his Fellatahs. He said he had heard of their wars and conquests; and I then observed, that not only himself, but every negro chief on this coast, had a common interest in preventing the Moors and their Mullams from usurping the whole of the country trade into their own hands, which, since their acquisition of Nyffé, where the palm-oil trade begins, they have ever aimed at doing. I thought it better thus openly to express myself than to leave any vague idea of mystery hanging over my projected visit to Funda; though I at the same time said that I had no direct commission from government to fulfil, but, in a commercial point of view, I might assist in opening up the resources of the country; and that I was travelling more particularly, like Mr. Holman, for my own amusement and instruction. Captain Becroft, for whom the Duke has much regard, will, I doubt not, from the kind zeal he has already shown in my behalf, arrange much better than I can my little matters of negotiation with him. I am convinced, from its long intercourse with England, that this is the best starting point; and having thus far made a good beginning, I hope it is not too presumptuous to look forward to a successful result, and that my next communication to you may be from Funda.

'Believe me, &c.

(Signed) 'C. H. Coulthurst.

Mr. Coulthurst to the Secretary of the Royal Geographical Society.

'Old Calabar, Friday, 16th March, 1832.

'My Dear Sir,—Having concluded my arrangements for proceeding through the Enyong and Eboe countries, I may as well let you know the route I have taken in case any accidental circumstance which I cannot control prevent early tidings of me getting down to the coast. The Calabar river, though it does not itself communicate with the Quorra, yet has a parallel course with it, and from the point I shall quit it, a few days' walk over a hilly country will, I am told, take me to Funda. Bonny, it is true, would give me the benefit of a water communication the whole way, as would Cross river; but both these rivers bear so

much to the west, that I should lose more time than in this advanced state of the season I can prudently spare; besides which, there is more safety in following the line of traffic through which Duke Ephraim communicates with the Eboe country, which, from its great extent, it is impossible to avoid, except by ascending the river of Benin, to which there are other and greater objections, from its having been the last great vent for the slavers. The Quorra, I was told by natives both of Bambarra and Koukan, during my stay in the Gambia, certainly rises in the Kissey country, to which, by the river of that name, not half a degree to the northward of Sierra Leone, there is a navigable stream for small craft for 300 miles into the interior; and it is to be regretted that the prior expedition which has ascended the Rio Grande should have taken the same low level as the Gambia and Senegal, and thus we have no knowledge, except through Caillé, of the great table-land of northern Africa. The principal mechanics here are from the Eboe country, and of a shade considerably lighter than the natives of the coast, nearly approaching to a copper tinge. There will be vessels here engaged in the palm-oil trade for three months to come, and I yet hope by one of these to let you hear from me from the source, at least, of the river.

'Believe me, &c,

(Signed) 'C. H. COULTHURST.'

Colonel Nicolls to R. W. Hay, Esq.

'Fernando Po, April 22th, 1832.

'SIR,—It is with sincere regret I inform you of the death of Mr. Coulthurst; he died on board the barque Agnes of Liverpool on the 15th inst. on her passage from Calabar. He had got as far as the Eboe country, about a fortnight's journey from Calabar. The King of Eboe refused to let him pass, when he returned to Calabar, and took a passage in the Agnes for this place; from what I can learn he was ill when he got on board the Agnes, which vessel had a very bad passage; her commander, Mr. Cosenham, was also ill. I have secured most, if not all, Mr. Coulthurst's effects, but I cannot find or get any intelligence of his writing-desk or journal; nor can I get, for the present, any further particulars. I shall send to Calabar as soon as possible, and do all in my power to secure his papers. The duke was very ill when the Agnes left Calabar. There appears to me to be some mystery about the journal and writing-desk; many valuable things, such as his watch, several gold rings, several small boxes of trinkets, looking-glasses, needles, scissars, knives, pistols, as would be supposed to excite the cupidity of the natives, are all safe in my possession, although most of them in very bad order from wet and

neglect. I ordered two magistrates, Mr. Becroft and Dr. Butter, with the clerk of the court, to make an inventory of them, in order to sell the whole by public auction, except the watch, four gold family mourning rings, and a broach, which I shall send to his father; and as soon as I become acquainted with all particulars I shall let you know.

'I have, &c.

(Signed) 'EDWARD NICOLLS, Lieut.-Colonel, &c.'

Mr. Coulthurst was the only surviving son of C. Coulthurst, Esq, of Sandiway, near Northwich, and was thirty-five years of age at the time of his death. He was educated at Eton; studied afterwards at Brazen Nose College, Oxford, where he took a very honourable degree; was entered at the Middle Temple, called to the bar, and resided six years in Barbadoes, where the influence of an uncle, who held a high legal situation in the West Indies, seemed calculated to bring him into advantageous practice. But from infancy his heart was set on African enterprise. His family is still in possession of some of his Eton school books, in which maps of Africa, with his supposed travels in the interior, are delineated; and at Barbadoes he used to take long walks in the heat of the day, in order to season himself for the further exposure which he never ceased to contemplate. His eager desires also took a poetical form; and a 'Soliloquy of Mungo Park,' and other pieces of a similar description, of considerable merit, were written by him at different times. The stimulus which at length decided him, however, was the recent success of the Landers. He feared that if he delayed longer, another expedition would be fitted out on a great scale, and leave nothing which an individual could attempt. He completed his preparations accordingly; and the following extracts from his private correspondence, at different periods of his voyage, are not without further interest.

Bathurst, (*Gambia*,) 1*st Feb.* 1832.—DEAR ———. After a conference and palaver with some of the native chiefs, among whose grotesque forms and equipments you would have laughed to have seen me perched this morning supping palm wine, I have made up my mind to take the southern bank of this river, through Fooladoo to Sego. A messenger from the Almana of Bondou, who has undertaken to bring the gum trade here from the Senegal, is now in Bathurst; and the merchants are willing to assist in making up a coffila, which will enable us, I trust, to prosecute our journey in safety. Though I shall not thus reach the main object of Funda so directly as if I had had the good fortune to overtake the Pluto, it would be scarcely possible for me to do this now before the rainy season; and though I shall be a few weeks later in gaining that destination, I shall have the satisfaction of tracing the *whole* river, and giving the position of all the remarkable places on it, which neither Caillé nor Lander were able to do. There is now no earthly chance of the observations made by Park seeing the light, for Mr. Ainslie showed me yesterday his last letter from Sansanding, which I perused with much interest. You are aware that nothing but the unfortunate concurrence of the Fellatah conquests with the period of his expedition, and his being mistaken for one of their parties, occasioned its unhappy result; and by striking across the mountains, which we shall do at Baranco, about four hundred miles up, (to which place the colonial schooner has been kindly provided for our passage by the worthy Governor, who will most probably, with the Chief Justice and a party, accompany us thus far,) we shall only have twenty-four days' land journey to the mighty Niger, where he has scarce command of water enough to float a canoe. I shall be heard from, of course, from the head of this river, and I hope also from Funda, about the time of the smokes in October next; and I also look forward to the possibility, I dare not use a stronger word, of receiving letters from England up the Old Calabar river by some of the palm-oilers which may reach me at that place.

The climate here is so very superior to that in the bights of Benin and Biafra,

that, after Barbadoes, where shade is unknown, it really seems comparatively cold. I took a stroll of half a dozen miles to-day before breakfast, which I could not have done, without feeling languid afterwards, in the West Indies; but Tyrwhitt never could have borne up against the breathing oven of the Gold coast. All therefore has, I humbly hope, been ordered for the best; and the encouraging kindness with which we have been here received, the happy close of the Mandingo war, (for just opposite the point from which I write this, only three or four miles over, was assembled a force of many thousand armed savages, only five weeks ago,) and the curious fact of a recommendation prepared two years back tallying with the returning friendship of the Mahommedan negroes, the most powerful and intelligent of their race, all concur to give a cheering prospect of the future. Everything reminds me here of the near neighbourhood of the desert, the toke and turban very general, every man, not a Christian, a Musselman; and, what seems strange to European eyes, persons in the coarsest checks with gold ornaments to the value of hundreds of dollars.

Monday next I expect will see us once more on the wing, and could ——— join us he would be delighted with some of the finest partridge shooting in the world. The beautiful harnessed antelope, which it is really a sin to shoot, is common in the bush; and milk, honey, and rice, are to be had in most of the negro villages, this being quite the dairy country of Africa. But then there are musquitoes that madden the best-tempered folks, and holy men with their eyes on the koran ready to dirk you for the slightest subject of difference; and it is curious to see the strangest characters of this sort well received and admitted to a familiarity at Government House, because they have much interest in the country, and it is politic just now to speak them fair. There is a savage sort of virtue, too, in these people, if you put a confidence in them and do not tempt them, as there is no danger of our doing, by the value of our goods. The island of St. Mary, on which this place is built, is a sandbank, four or five miles in extent, divided by a narrow creek from the main; and our authority does not extend a mile farther. Nothing but the shells preserved the place from being overrun by the Mandingoes, who are now, like the Turks, getting well armed with European muskets, and will never let their country be made an India of by us. They are some of the finest-made fellows I ever beheld, with none of the thick-lipped deformities of the southern negro.

Bathurst, 16*th Feb.*, 1832.—Dear ———, I will not leave the Gambia without redeeming the promise I made of letting you hear from me soon after my arrival in Africa. I was almost induced here to alter my destination so far as to proceed by the way of Sego; and, had arrangements been made to forward me on immediately, I believe I should have been tempted by the idea of traversing the whole course of the river from its source in the Kissey country, in which, from authentic information, it is ascertained it takes its course, to the Bahr-Abiad, where the natives here still persist that it flows.

Major Laing was correct in all the main outlines of his account; and one inducement with me for taking the western route would have been the hope of recovering his documents, which I am given to understand are at a place within a fortnight's journey of Timbuctoo. But the St. George being positively off to-morrow to the southward, and a gentleman here having undertaken to explore the nearest point of communication between this river and the Joliba, I shall hasten to the main object of my enterprise, with the hope of reaching Funda before the rains come down in any force; and at this time of the year I shall have the benefit of a south-westerly wind up the rivers in the Gulf. This place ought to have been selected, instead of Sierra Leone, as head-quarters for Western Africa, affording, as it does, the best inlet into the interior, whereas the latter is completely isolated; and the native chiefs are now anxious, from its superior local advantages, to transfer the gum trade here from the Senegal, which, except during the rainy months, (of no long duration on this part of the coast,) is almost hermetically sealed by its bar.

I am as well as I ever was in Cheshire; and, in a blanket dress, with my dreadnought canopy, may, I trust, defy the rains. This is merely a dry heat, the sand and locusts giving clear intimations of our near proximity to the desert.

Old Calabar, 19*th March*, 1832.—Dear ———, As to-morrow evening will, I trust, see me fairly embarked up the Calabar on my way to Funda, I must now give

you some account of myself since leaving the Gambia. The early part of our passage was favourable; but we were so impeded by tornadoes, succeeded by calms in the Gulf, that I did not get to Fernando Po till yesterday week. Nothing could be kinder than the reception I met with from Colonel Nicolls, who sent me over in his own schooner free of expense; but I have certainly been unfortunate in not meeting with men-of-war. Mr. Barrow's letter will, however, I hope, be equally available to me in the Mediterranean. Nothing can exceed the beauty of the mountain forest of Fernando Po; the finest trees in England are dwarfs both in girth and height in comparison; and its highest peak equals in elevation that of Teneriffe; unlike which, however, it is generally mantled in clouds, and is only at intervals visible. I much enjoyed bathing in its clear transparent brooks, where the water is always pure and cool from the shady roof some hundred feet above; but here I cannot venture, on account of the alligators with which the river swarms. Three large Liverpool ships are lying here; and I had an excursion yesterday to Creek Town, once a very flourishing place, but now almost depopulated from the effect of African witchcraft. I saw some remains of handsome French mirrors, and other really costly things, such as handsome English sofas and chairs, broken to pieces, and offered up in the Devil's house of the place. Though Captain Owen by his exertions put a stop to human sacrifices openly here, yet every house of any pretensions,—and some are very well built and handsomely painted with the representations of tigers, snakes, and different fantastic figures, such as those given in Bowdich's Ashantee,—has, moreover, attached to its fetish tree in the centre of the open quadrangle or court, a skull, suspended to avert ill luck from its inmates; it is, however, held in no veneration, being that of some slave selected for the occasion. But the horrid error of their belief lies in the opinion that when an African gentleman goes to the other world he will be respected in proportion only to the number of slaves and dependants he carries with him: so that the best feelings of our nature are actually enlisted in the perpetration of these wholesale murders. Yet that they are an amiable people, in many respects, I can myself attest; their treatment of their slaves is much milder than I could have imagined the state of slavery to admit of; and their country, so far from being over-peopled, seems only here and there won by patches from the woodland, and teems with plenty under the most slovenly cultivation. Even now that the slave-trade here, owing to the late co-operation of the French, is nearly abolished, they get every thing they want in exchange from Europe for the oil from the palm which grows wild in their forests. The sugar-cane, which I have been used to consider so precious, is gathered in its wild state, and is now being actually devoured in quantities by the slaves of the house while I am writing. The population of this place I should think equal to Northwich. With regard to scenery, a bend of the river near here, about the width of the Thames below London, resembles much that from Richmond Hill.'

Mr. Coulthurst was absent up the Calabar river about three weeks, and considered the refusal of the king of the Eboes to allow him to pass to have been chiefly owing to a war then raging in the country. He had not been exposed to any very severe fatigue; but his disappointment was great, and he laboured under considerable debility and depression of spirits. He died, without much suffering, on the second day after embarking in the Agnes.

VI.—*On the Submersion by the Sea of Part of Hayling Island, near Portsmouth, in the Reign of Edward III.* Communicated by Sir Thomas Phillips, Bart., F.S.A.

It appears from the document subjoined, that in the second year of the reign of Richard II., a petition was presented by the inhabitants of Hayling Island, claiming exemption from a proportion of taxes levied on them, in consequence of the loss of a great part of their island by the encroachments of the sea. And an inquest being held to investigate the facts, it was reported, that in the fourteenth year of the preceding reign, the greater part was so destroyed, that the site of the parish church, which at first was in the centre of the island, became afterwards on the sea-shore, and was then two leagues out in the sea; the inhabitants, at the same time, stating that three hundred acres of arable land had been thus lost in forty-three years, and that at every wave a portion of soil was destroyed.

It would be interesting to make a collection of such records, or other documents, as would illustrate consecutively the changes which have been thus progressively made on our coasts. In the meantime the following furnishes some details respecting this one catastrophe.

From the Records of the Lord Treasurer's Remembrancer's Office in the Exchequer at Somerset House.

'Compertum est etiam alibi in hiis memorandis inter visus comp. de termino S. Hilar. (a° 1mo Ricardi 2^{di}) quod Johannes Tychbourn, Chivaler et socii sui, nuper collectores predictarum duarum quintarum decimarum, et decimarum Domino Regi nunc dicto anno primo concessarum, habent respectum de 27*l.* 0*s.* 6½*d.* de quibus onerati fuerunt pro 15ma contingente homines insulæ de Hayling. Quibus expositis predictis hominibus dicunt quod ipsi graviter distringuntur tam per Vicecomitem Suthampton quam per predictos collectores pro predictis summis regi solvendis. Et hoc minus juste, quia dicunt quod ipsi, pretextu magnæ consumpcionis terrarum suarum in insula predicta et fluxus maritimos et propter alias diversitates quibus subjacent ante hæc tempora tam propter sumptus et onera quæ pro defensione insulæ predictæ contra hostiles aggressus sustinuerunt ad tantam penuriam sunt collapsi quod ipsi aliquam summam ultra predictas 6*l.* 15*s.* 7½*d.* ad quos de novo taxantur ad 15^{mam} solvere non sufficiunt. Et hoc pretendunt verificare, &c. &c.

'Ulterius, &c. compertum est in memorandis de anno 14 predicti regis avi, inter visus comp. de termino S. Trinitatis, *viz.* post summam Johannis Roches et Willielmi Brokhurst nuper collectorum 15^{mæ} et 10^{mæ} triennalium, eidem regi avo laicis concessarum

anno 11 predicti regis avi in predicto comitatu Suthamton, quod Villæ de *Stoke*, Estoke, Northwode, Suthwode, Myngham, Westiton, et Hayling, infra insulam de Hayling existunt et quod major pars ejusdem insulæ dicto anno 14^{mo} per inundacionem maris destructa fuit penitus, et consumpta. Quod locus ille ubi ecclesia parochialis ejusdem insulæ primo constructa in medio dictæ insulæ fuit et edificata infra tempus bonæ memoriæ quorundam ad tunc ibidem veniencium juxta littus maris existebat tota integre et tunc fuit in mari ita profundo quod major navis Angliæ ibidem transire potuit et quod tunc distabat a terra circa duas leucas, et sic de die in diem per totam partem versus mare destruebatur terra et consumebatur per inundacionem maris, &c. &c.

'Ita quod onera dictam insulam contingentia prout prius solebant ad tunc supportare nequaquam sufficiebant, et sic bona et catalla hominum villarum illarum destructa fuerunt et consumpta, pretextu quarum destructionis et consumptionis, ac aliorum onerum predictorum, quam plures homines villarum predictarum causâ indigenciæ, se ac eisdem villis retraxerunt.'

Upon hearing which complaints, the king's commission was issued to make inquiry into the facts, and the jurors, appointed in the second year of Richard II, gave the result in the following words:—

'Dicunt super sacramentum suum quod homines de Haylyng pretextu magnæ consumpcionis terrarum suarum in insula de Haylyng et fluxus maritimos et propter alias adversitates quibus subjacentur ante hæc tempora tam propter sumptus et onera quæ pro defensione insulæ predictæ contra hostiles aggressus et ad tantam penuriam collapsi sunt, &c. quod decimam solvere non sufficiunt, &c. &c. Et dicunt quod homines insulæ predictæ diversas Walleas de pilis, terra et turbis pro salvatione terrarum suarum in diversis locis in insula predicta fecerunt ad custagia hominum insulæ predictæ 40 marcarum, quæ per fluxus maritimi omnino sunt confractæ et destructæ et per mare submersæ.

'Et dicunt quod 300 acræ terræ arabilis quæ coli et seminari solebant per mare submersæ sunt et omnino destructæ infra 43 annos preteritos. Et est nunc ibidem altum mare, et ad quamlibet fluxum maris quædam pars terrarum insulæ predictæ destruitur et superundatur; quæ terra sic superundata per fluxum maris per quinque annos vel sex tunc proxime sequentes seminari non potest.'

VII.—*Extract of a Letter from Captain Fitz Roy, of H. M. Sloop Beagle, on the subject of the Abrolhos Bank.* Communicated by Capt. Beaufort, R.N., F.R.S.

Rio de Janeiro, 10th April, 1832.

'On the 18th of March we sailed from Bahia, and worked our way slowly towards the eastern limit of the Abrolhos banks. The winds, being light and easterly, favoured our sounding frequently, and taking good observations.

'Having reached the parallel of the islands, to the eastward of the easternmost soundings laid down in the charts, and finding no ground with three hundred fathoms of line, I began to steer westward, sounding continually, and keeping a sharp look out at the mast head. At two P.M., on the 26th, we had no bottom with two hundred and thirty fathoms, and at four P.M. we found only thirty fathoms, without the slightest change either in the colour of the water or in its temperature, or any indication of so sudden a change in its depth.

'I directly hauled to the wind and worked back again to the eastward, to have another opportunity of confirming the place of the edge of the bank. We lost soundings as suddenly as we found them; and in standing to the westward a second time, with a grapnel towing astern by two hundred fathoms of line, we hooked the rocky bottom and straightened the grapnel; but my object in ascertaining the exact beginning of the bank was gained.

'From that spot we had soundings in less than forty fathoms, until we anchored near the Abrolhos islands.

'I passed to the southward and eastward of them, because that side had not been examined, but time would not allow of my doing what I wished while so favourable an opportunity offered.

'At least a fortnight would be necessary to complete the survey of Baron Roussin, which appears, so far as we have examined, to be extremely correct. The soundings are so irregular that little dependence can be placed on the lead. It is only by a multitude of soundings, by watching the sea when there is much swell, and traversing every part with a sharp look out at the mast head, that the neighbourhood of the Abrolhos, particularly to the south-east, can be thoroughly examined.

'More than once we had four or five fathoms under one side of the vessel and from fifteen to twenty under the other side. The *sauts de sonde*, as the French express it, are surprising.

'The tide, or rather current, which we experienced, set continually to the southward for the three days that we were near these islands, varying from half a mile to a mile and a half an hour.

'I supposed that the bottom was chiefly composed of coral

rock, but was surprised to find no coral excepting small fragments growing on the solid rock, which is chiefly gneiss and sandstone. As most of the charts say "*coral rock*," I have sent a few of the soundings for your inspection, and you will see by them that what has here been called coral is the coating of a solid rock formed by the deposit of the sea-water, mixed with coralline substances and what a sailor generally calls "barnacles."

'My meridian distance of the Abrolhos rocks from *Bahia*, their latitude, and their size, agree precisely with those given in the French survey. But between Bahia and Rio de Janeiro, and consequently between the Abrolhos and Rio de Janeiro, there exists a difference of from four to five miles between us, this being the only point on which I have found any such difference either on this or on the Beagle's former voyage.'

Having made both passages, I venture to observe, that going within the Abrolhos certainly shortens that between Rio and Bahia very much; but yet I should not recommend it to any vessel unless she has reason to make unusual haste. The soundings are very irregular, varying suddenly from twenty to six fathoms; and there are both reefs and currents.

VIII.—*Communication between the Ganges and Hooghly, &c.* Communicated by Lieut. J. H. Johnston, R.N.

The Nuddeah rivers, which connect the Ganges with the Hooghly, are, during eight months in the year, so extremely shallow as not to admit of a passage being effected by them between the rivers; and the water communication between Calcutta and the upper country is consequently maintained during that time by the Sunderbund passages, at a great expense of time and labour. A plan has, therefore, been lately proposed by Major Forbes, of the Bengal Engineers, and is now under consideration in India, for constructing a canal, which, branching off from the Ganges at Rajamahl, shall join the Hooghly at Mirzapore, near Kulna. And the object being approved by the Governor-General, the requisite surveys and estimates are now making to ascertain the expediency, otherwise, of carrying the scheme into effect.

The great difficulties arise—1. from the difference of level (sixty feet) between the Ganges and Hooghly at the points in question, which, with the friable nature of the intervening country, makes an open cut inexpedient:—2. from the difference in the level of the Ganges at different seasons, amounting to not less than thirty feet;—and, 3 from the number of hill-streams which intersect the line. To overcome them it is proposed to cut the bed of the canal at Rajamahl six feet below the lowest level of the river, providing

it, at the same time, with locks, rising, when required, to its greatest height; thence to skirt the Rajamahl hills, on sound good ground, for eighty miles, crossing the hill streams, already noticed, on aqueducts; and, finally, to lock down to the Hooghly between two of them, the Adji and Damooda, coming out, as stated, at Mirzapore. This line, besides being three hundred miles shorter than the present passage, would come within a little distance of the coal-mines, now worked to the extent of three or four hundred thousand maunds (bushels), and cross a country abounding in rich iron ore, limestone, &c. And though the expense is roughly estimated at fifty lacks of rupees (500,000*l.*), the return, with moderate tolls, would, it is thought, be not less than 10 per cent. on this capital.

The work would take some years to execute, besides the delay which must yet intervene before the plan is matured; but, in the meantime, taking advantage of the opportunity afforded by the mention of coal on the projected line, the following facts may be acceptable. Coal is extensively diffused in Bengal, Sylhet, Burmah, and Arracan; but has only been worked, as yet, on a considerable scale, at Beerboom, on the Damooda river, above alluded to, whence it is delivered in Calcutta at eightpence to ninepence a bushel. The great expense, however, of its conveyance from this to the upper provinces, has lately induced the governor-general to order seams to be opened at Hurrah and Sikree, on the banks of the Ganges, about half-way between Calcutta and Benares, by the water route; and a recent report received from Captain Tanner, who is charged with the works there, of the progress made, is subjoined.* In strength, Indian coal, as hitherto extracted, may be considered from a fourth to a fifth inferior to the best Newcastle. It burns freely, but does not answer

* '*Bhangulpore* (*near the Hurrah Colliery*), *March* 4, 1831.—As our seam dips the quality improves, and the supply promises to be most abundant. It was at first slaty in fracture, but is now conchoidal; ignites easily; and as fuel is all that is required. I consider it even better than the Rajamahl coals.

'Some days ago I had about ten seers (20 lbs.) fresh from the mine, broken into small pieces, and built up in the form of a pyramid, so as to admit of a circulation of air; having fired which, I remarked, that as the heat increased a brownish liquid exuded, the flame was blue for the first half hour, then for half an hour bright red, and afterwards a glowing redness was diffused throughout the pile for two hours. The smoke was first black, then white; the odour was stronger than was given out by the sort of coal first extracted; and the whole was consumed in eight hours, the pieces retaining their shape, but white and soft.

'The next day I had a similar quantity dried in the sun; from which, when afterwards burnt, I observed no liquor exude; and the ashes left were harder, but not what could be called a cinder. In other respects the results were the same.

'Our adit is now twenty feet wide and sixty long. I observe that the bed is perpendicularly divided by three seams the whole length, which keeps the sides even; while the transverse seams enable the workmen to extract some pieces of two to three maunds each. The fresh fracture is a dark grey colour, but blackens on exposure to the atmosphere. It feels slightly greasy at first, but roughens as it changes

for coking or smithy purposes; though being as yet worked only near the surface, its quality may improve as the shafts descend.

IX.—*Recent Information from Australia.* From communications made to the Royal Geographical Society.

In June last the following extract of a letter from Lieut.-Colonel Dumaresq (New South Wales) was communicated to the Royal Geographical Society by Mr. Hay, V.P.

'I must now put you in possession of a report which has been made by a man named Barber, a runaway convict, who has lived for these last five years with the aboriginal natives of the interior.

'He was recently captured by a detachment of the mounted police, and states that he has twice traversed New Holland in a north-westerly direction, and has reached the northern coast by following the course of a river which rises towards the western extremity of the chain of mountains by which Liverpool plain is bounded, and by which it is separated from the valleys of the Goulburn and Hunter rivers. He describes this river as running in a broad and deep channel, for many hundred miles without any impediment to its navigation, and as finally emptying itself into a lake of great extent, whose junction with the ocean he could not see across. The natives of the coast informed him that strangers visit it for the purpose of procuring a scented wood, which they float away in great quantities. These strangers are held in great terror, and are said to be armed with two spears, "a long and a short one," the latter of which alone is thrown (bows and arrows, we may conclude). They arrive in canoes made of wood, and not formed of bark as the natives' canoes are,—are dressed in a kind of shirt reaching to the elbows, and wear trowsers which do not descend below the knee. (Malays.)

'Barber further saw the stumps of many trees which had been cut with an axe, as also a man who had been wounded with the short spear alluded to, and which the natives describe as being thrown with great force and precision. His story, on the whole, is very circumstantial; and Major Mitchell (the surveyor-general)

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colour. The fragments sliding over each other have a slightly metallic sound; and wherever the tools strike the lustre is glistening.

'I shall continue to note any changes, but refrain at present from surmising the probable result. As the sinking goes on, the true nature of this immense bed of coal will be developed effectually.

'I have, &c.

'H. Tanner, Captain.'

is about to proceed for the purpose of determining the fact of the existence of a dividing range between the sources of those waters which Captain Sturt traced to the southward, and those mentioned by Barber. Should this point be established, there is, perhaps, no reason why this latter's story may not, in all essential particulars, be correct. He is a very intelligent man, and remarkably handsome. His body is tatooed all over; and he has completely adopted the habits of the native blacks, over whom he has obtained that degree of ascendency which may be supposed to result from his superior qualities.'

On which statement, and others similar received about the same time, Mr. Cunningham (author of the paper on 'Australian Discovery, pp. 99-132) has tendered the following remarks to the Royal Geographical Society:—

'That the convict in question, on first taking to the bush and passing to the westward of Liverpool Plains, should have found a river running to the north-west is not at all a matter of surprise, since he could not well avoid intersecting either the channel of the *Yorke* or *Field* of Mr. Oxley, which are streams that drain those extensive levels, and, after a course of more than a hundred miles through a wooded country to the north-west, unite and form a tributary to the Darling of Captain Sturt. But that he subsequently, at any period of his long absence in the wilds of the interior, should have traced a river across the continent to its discharge on the northern coast, with no other means of sustenance to support a journey of thirteen hundred miles to the nearest sea than what an Australian forest would afford him,—or that he should have even had the disposition to have prosecuted so long a tour, in which he could have induced no aboriginal native to accompany him to assist in procuring food as he advanced,—seems to me extremely questionable, notwithstanding his having adopted the habits of the savage, the tract of country over which each family of aborigines ranges being extremely limited, and one tribe being very careful not to pass the confine of the fishing or hunting grounds of another.

'When first transported, this man, Barber, as I learn, was assigned to a millwright and miller, named Singleton, residing on Hunter's river, from whom he soon absconded, and, determining on a wandering life in the interior, he crossed Liverpool Plains to the westward, and soon reached the base of Arbuthnot's range of Mr. Oxley, named Warren-bungle by the aborigines. Some miles to the westward of that very elevated range of mountains, passes the Castlereagh river of the same able traveller, the principal streams of which originate in the western extremes of the dividing range, by which Liverpool Plains are bounded on the south; and, on the banks of this river, he joined a tribe of natives,

with whom he followed it down to the north-west, upwards, as he estimated, of four hundred miles. This distance, however, was greatly overrated, for Captain Sturt has shown us, that in a hundred miles or thereabouts, this river falls into the Darling, to the point of confluence with which, Barber appears not to have traced its channel; but crossing it, for some reason which does not appear, he quitted its banks altogether, to prosecute a fresh course to the north-east. On their new line of route, he and the natives continued some days, when they reached the left bank of a large river, named by the latter Kin-dur or Kiendar, which he describes as being deep, free from falls, rapids, or other impediments to navigation. A slight current was perceived in it, setting to the westward, and its banks were generally so low as to be nearly level with the surface of the water. The right, or north bank (continues the story) was backed by lagoons, supported by freshes from the river; but beyond, as the ground rose, extensive plains extended, which were found to be altogether destitute of water. In a word, by a reference to the map, it is very evident that the Kiendar is my Gwydir, a considerable river formed by a junction of the Peel of Mr. Oxley, with another of equal magnitude discovered by me in 1827. The characters of the two agree perfectly, for at the point at which my party forded it, viz. at its last rapid, it was beginning to assume those features, in its deep channel, sluggish motion of current, and low muddy banks, which it most probably afterwards uniformly retains, or, at all events, presented at the point of intersection by Barber and his native associates. And the situation of the last rapid in the bed of the Gwydir above-mentioned, by which I passed its channel in my journey homeward in 1827, being lat. 29° 38′ S., long. 150° 20′ E., and the direction the river there took interiorly, being about W.N.W., it may be thus fairly presumed that a north-eastern course across the country from the Castlereagh would cut the Kiendar or Gwydir, about the meridian of 149° and parallel of $29\frac{1}{4}$°, thus making the spot where the bushranger first beheld that fine river about a hundred miles to the westward and northward of my ford, where the navigation ceases, and where the mean elevation of the country above the level of the sea (as determined by barometrical admeasurement) was only 895 feet.

'Assuming, then, the story of this runaway, as far as regards his journey down the Castlereagh, and his subsequent intersection of a large and navigable river, some days' travel to the north-east of it, to be correct, which I think is extremely probable, we have, as above shown, the points in the interior, before unknown to white men, to which he did thus penetrate, as well as the particular river which he met with, and (unacquainted as he must have been with what had already been explored by others) supposed to be a

"discovery." Here, however, we must rest, and say nothing of his further progress on its banks, but rather leave that, as well as the extreme distance to which he may have explored it to the westward, to be determined by a more scientific traveller.

'As it appears, however, that Barber made two distinct journeys through the interior of the country, this may be viewed as his first excursion; for his history, as I have obtained it, goes on to say, that after he had been living with the natives between two and three years, he returned to the service of his master, Singleton, who, it would appear, received and gave him employment; and to whom he was ever relating his adventures, and the discovery he had made, by the aid of the natives, of a large river, with luxuriant pasturage on its banks. At length he thus induced him and another settler in the neighbourhood, to equip themselves for a journey to the river, with the view of exploring it further than he had himself done. Acting as their guide, he conducted them to the Kiendar, which they traced for some distance through a level country; but one morning, when they rose to pursue their explorations farther to the westward, the convict was missing, having very quietly gone off at dawn of day with some natives, who had been with the party. And thus the two adventurers were left to find their way home as well as they could; nor was Barber again heard of until apprehended by a detachment of the mounted police last year.

'The second part of this extraordinary man's history, fraught no doubt with curious adventures, is less known in detail. It appears, that having determined to see more of the Kiendar, or Gwydir, as well as the interior through which it bends its course, than he had in his first journey, he possessed himself of a horse from one of the outer stock-stations (probably on the Castlereagh), and with this proceeded down the river; but how far he penetrated, and what was the character of the country which he visited, can only be determined on Major Mitchell's return. Thus much, however, may, I think, be anticipated with some confidence, viz. that those parts of his story which relate to his having followed the river for many hundred miles, to its discharge by a lake into the ocean on the northern coast—his having there learned from the aborigines, (who are well known to be extremely hostile to all strangers, in consequence of their frequent skirmishings with the Malays,) that men armed with bows and arrows visit these shores in large canoes, for the purposes of procuring a scented wood and a marine slug—and his description of an animal like a hippopotamus inhabiting the river, and of large baboons frequenting the woods of those inter-tropical regions,—are wholly fabricated, and designed to excite public interest in the colony, and avert that punishment which he doubtless apprehended

awaited him on his being captured; not simply for the act of absconding from his employer, and having been a convict at large for several years, but for the crime of horse-stealing.

'A burning mountain also, which figures in some accounts as an appendage to the mouth of his river, which otherwise is stated to pursue its course very sluggishly through an internal country, without a single hill, appears evidently to have been intended to give additional weight and interest to the whole discovery; and may be considered to have suggested itself to the inventive imagination of the runaway (who is admitted, on all hands, to be a very clever, intelligent person) by the public attention being, about the time of his apprehension by the police, directed, through the medium of the Sydney Gazette, to the second visit of one of the assistant chaplains of the colony to Wingen, an eminence situated on the crest of a rocky ridge near the sources of Hunter's river, which was accidentally discovered, in 1818, to be on fire, and where the process of combustion is said to be still going on.*

* [The following account of these two visits, made in 1830 and 1831 by the Rev. C. P. N. Wilton, chaplain at Newcastle, is abridged from the Australian Almanac for 1832:—

'Mount Wingen is situated on the South-Eastern side of the dividing range which separates the lands of Hunter's River from Liverpool Plains, in lat. 31° 54′ S., long. 150° 56′ E.; and the elevation of the portion of it under the process of combustion cannot be less than from 1400 to 1500 feet from the level of the sea. At the period of my first visit, in the beginning of last year, this comprehended parts of two declivities of one and the same mountain, composed of compact sand-stone rock. The progress of the fire had previously been down the northern and highest elevation, and it was then ascending with great fury the opposite and southern eminence. From the circumstance of its being thus in a hollow between two ridges of the same mountain, a former visitor was probably induced to give the clefts in the mountain the appellation of a crater; but the fact is, the rock, as the subterraneous fire increases, is rent into several concave chasms of various widths, of which I had an opportunity of particularly examining the widest. The rock, a solid mass of sandstone, was torn asunder about two feet in width, leaving its upper and southerly side exposed to view, the part so torn asunder having slipt down, as it were, and sunk into a hollow, thus forming the concave surface of the heated rock. On looking down this chasm to the depth of about fifteen feet, the sides of the rock were perceived to be of a white heat, like that of a lime-kiln, while sulphureous and steamy vapours arose from the aperture, amidst sounds which issued from a depth below, like blasts from the forge of Vulcan himself. I stood on that portion of the rock which had been cleft from the part above, and on hurling stones down into the chasm, the noise they made in the fall seemed to die away in a vast abyss beneath my feet. The area of the mountain, over which the fire was raging, was about an acre and a half in extent. There were throughout it several chasms varying in width, from which are constantly emitted sulphureous columns of smoke, accompanied by brilliant flame, the margins of these being beautified with efflorescent crystals of sulphur, varying in colour from the deepest red orange, occasioned by ferruginous mixture, to the palest straw colour, where alum predominated. A black, tarry, and lustrous substance—a sort of of bitumen—abounded on the edges of several of the clefts. Specimens of this were with difficulty obtained, from the intense heat under foot, and the suffocating quality of the vapours emitted from the chasms. No lava or trachyte of any description was to be met with, nor was there any appearance of coal, although abounding in the vicinity. The mountain has evidently been on fire for a great length of time: several acres above the part now under combustion, on which trees are standing of

'I would further remark, however, that it appears by various letters from the colony, that an idea is at length entertained there

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a great age, having, as it were, been steamed, and many of the stones upon it bearing the appearance of vitrification. The fire is still raging, and will probably continue to do so with increasing fury. Materials from beneath from time to time become ignited, whether by electricity, or other unknown cause, and the expansive powers of the heat and steam shiver and split into large masses the solid rock of sand-stone, and thus form continued chasms. The sulphureous and aluminous products of the mountain have been successfully applied in the cure of the scab in sheep.'

About four miles along the shore, from Newcastle towards Red-head, the cliff was also observed, in 1828, to be on fire, evolving sulphureous vapours; and a beautifully crystallized mineral, which appeared on examination to be muriate of ammonia, intermingled with sulphur, was collected from the margin of the crevices. This fire, however, in 1830, became extinct;—unlike that on Mount Wingen, of which Mr. Wilton thus again speaks at this period:—

'The fire, since the period of my former visit, had, I found, been by no means inactive, having extended over a surface exceeding two acres, and was now raging with increased fury up the eminence to the S. and S.S.W., and also on the hitherto extinct portion of the mountain,—the northern elevation. There were still most splendid crystals of sulphur on the margins of the more extended crevices, where the fire was burning with a white heat, and of ammonia on those of the less, from both of which suffocating fumes were incessantly evolving. The fire continued roaring beneath, and stones thrown down into the chasms resounded to a great depth in an interior abyss. The scene of disruption, the rocks of solid sand-stone cleft asunder, the innumerable fractures made on the surface, the falling in of the strata, the half-consumed prostrate trunks of trees, and others only awaiting the slip of the rock beneath them to fall in their turn, the pernicious vapours rising around amidst the roaring of the internal fires, and the white and red heat of the burning crevices, present an appearance on which the beholder cannot fail to gaze with wonder, and, at the same time, to lament his inability to account with any degree of certainty for the first natural cause of the spectacle before him.

'At a little distance from the burning portions of Wingen, I picked up several amorphous specimens of carnelian, white, pinkish, and blue; angular fragments of ribbon and fortification agates, and balls of agate, some of them filled with crystals, varying from the size of a pea to that of a hen's egg, and others of a bluish white and clouded colour, having spots of white dispersed throughout them, which, if cut and polished, would present a very beautiful variety of this mineral. Mount Agate, also, in the neighbourhood of Wingen, presented me with some fine specimens as well of agate (fortification and ribbon occurring in the same specimen) as of fragments of white and bluish carnelian; and had not the grass upon the mountain been so long and thick as it proved to be, I should doubtless have collected much finer.

'Several of the agates collected from Mount Wingen, upon examination, were found to have their surfaces crusted over with iron; some of those from Mount Agate, with native copper; while others, from the same locality, presented a most beautiful auriferous appearance. On Mount Wingen we found, within but a few yards of that portion of it which is now under combustion, the cast of a bivalvular fossil shell in sand-stone, a species of *terebratula*: other similar specimens have been met with on another part of the mountain. Only two specimens of organic remains, of the nature of petrified bone, have hitherto been discovered in the neighbourhood of Mount Agate; viz. the sacrum of some large animal on the Holdsworthy Downs, and the second cervical vertebra of another, about ten miles west from Merton; but in neither instance was the petrifaction imbedded in the subjacent strata, but merely lying on the surface of the soil; and therefore, most probably, contemporary with the petrified wood, which is found scattered very abundantly over this tract of country. Near the chain of the Kingdon Ponds, forming one of the sources of the Hunter, and rising in the dividing range a few miles N. by W. from Mount Wingen, are stumps of trees standing upright in the ground, apparently petrified on the spot where they formerly grew. In some places the wood is

of the existence of a dividing range of hills between the sources of those waters which Captain Sturt traced to the southward, and those, mentioned by Barber,—or, in other words, between the Murray which Captain Sturt followed to its estuary at Encounter bay on the south coast, and Barber's Kiendar, which latter joins the Darling. To which opinion of the tendency of the internal rivers in that country, I have subscribed ever since Mr. Oxley's return from his second expedition to the interior in 1818; when he was as fully satisfied as I was, of the existence of some low ridge of hills, or grounds of sufficient elevation, separating the Lachlan river, and the other streams to the south of it, (which we now know are disembogued on the south coast,) from the Macquarie, and all rivers whose channels lie to the northward of it, and which flow interiorly toward the north-west, their estuaries remaining yet to be discovered. This dividing ridge of hills will, doubtless, be found whenever the space between Darling river in 30¼°, and the Murray in 34° south, in extent about four hundred miles, is attentively explored.

Recent arrivals from New South Wales have also brought information of the return of Major Mitchell, after an absence of about four months; and colonial newspapers have been received, which contain the two following letters (written by him from different stations in the interior) to the local government. From these it would appear, however, that no material discovery has been made, the expedition having been prevented from pushing forward beyond the country already known by a loss sustained of a portion of its provisions, and by the more distressing circumstance

strongly impregnated with iron. About three miles along the coast south of Newcastle, in an upright position, at high water-mark, under the cliff, and beneath a bed of coal, was also lately found the butt of a petrified tree, which, on being broken, presented a fine black appearance, as passing into the state of jet; and on the top of the cliff at Newcastle on which the telegraph stands, imbedded at about a foot beneath the surface, lying in a horizontal position and nearly at right angles to the strata of the cliff, the trunk of another, finely grained and white,—both specimens being traversed by thin veins of calcedony. The coal, which is exposed to view on the face of the cliffs, is of the independent formation, and appears to run generally in three parallel horizontal beds; but in some places with a varying dip. It alternates in one part of the cliff with slaty clay, sand-stone, and shale, with impressions of leaves; at another with mill-stone grit, and a hard chertzy rock. Nodules of clay-iron stone, and trunks and stems of arundinaceous plants in iron-stone, are seen in abundance in the alternating strata of the cliff; and in one place a narrow bed of iron-stone, bearing impressions of leaves, is remarkable; while thin laminæ of the same mineral, the surface of which is traversed by square and variously-shaped sections, are seen on several parts of the shore, both in the face of the cliff parallel with the beds of coal, and extending into the sea, forming the strand at low water.']

of the death of two of the party, who were brutally murdered by the natives :—

'Bullabalakit, on the River Nammoy,
in lat. 30° 38′ 21″ S. long. 149° 30′ 20″ E. Dec. 23, 1831.

'Sir,—I have the honour to state, for the information of his Excellency the Governor, the progress I have made in exploring the course of the interior waters to the northward of the colony.

'On crossing Liverpool Range my object was to proceed northward, so as to avoid the plains and head the streams which water them, and also the mountain ranges on the east.

'I arrived, accordingly, by a tolerably straight and level line, at Walamoul, on Peel's River; this place (a cattle station of Mr. Brown) being nearly due north from the common pass across Liverpool Range, and about a mile and a half above the spot where Mr. Oxley crossed this river.

'I found the general course of the Peel below Walamoul to be nearly west; and after tracing this river downwards twenty-two miles, in direct distance, I crossed it at an excellent ford, named Wallamburra. I then traversed the extensive plain of Mulluba; and leaving that of Coonil on the right, extending far to the north-east, we passed through a favourable interval of what I considered Hardwick's Range, the general direction of this range being two points west of north.

'On passing through this gorge, which, from the name of a hill on the south side, may be named Ydire, I crossed a very extensive tract of flat country, on which the wood consisted of iron bark and acacia pendula; this tract being part of a valley evidently declining to the north-west, which is bounded on the south by the Liverpool Range, and on the south-west by the extremities from the same. On the west, at a distance of twenty-two miles from Hardwicke's Range, there stands a remarkable isolated hill named Bounalla; and towards the lowest part of the country, in the direction in which all the waters tend, there is a rocky pic named Tangulda. On the north, a low range, named Wowa, branching westerly from Hardwicke's Range, bounds on that side this extensive basin, which includes Liverpool Plains. Peel's River is the principal stream, and receives, in its course, all the waters of these plains below the junction of Connadilly, which I take to be York's River, of Oxley.

'The stream is well known to the natives by the name Nammoy; and six miles below Tangulda, the low extremities from the surrounding ranges close on the river, and separate this extensive vale from the unexplored country which extends beyond to a horizon which is unbroken between W.N.W. and N.N.W.

'The impracticable appearance of the mountains to the northward induced me to proceed thus far to the west, and on examining the country thirty miles north-east by north from Tangulda, I

ascended a lofty range extending westward from the coast chain, and on which the perpendicular sides of masses of trachyte (a volcanic rock) were opposed to my further progress with horses; it was therefore evident that the river, supposed to rise about the latitude of 28° would not be accessible, or at least available to the colony in that direction, and that, in the event of the discovery of a river beyond that range flowing to the northern or north-western shores, it would become of importance to ascertain whether it was joined by the Nammoy, the head of this river being so accessible that I have brought my heavily laden drays to where it is navigable for boats, my present encampment being on its banks, six miles below Tangulda. From this station I can perceive the western termination of the Trachytic range, and I am now about to explore the country between it and the Nammoy, and the further course of this country, and in the event of its continuance in a favourable direction, I shall fix my depôt on its right bank, whence I now write, and descend the stream in the portable boats.

'I have the honour, &c.

'T. L. MITCHELL, Surveyor-General.'

'The Honourable the Colonial Secretary, &c. &c.'

'Peel's River, 29th February, 1832.

'Sir,—I have the honour to inform you, for the information of his Excellency the Governor, that I have reached the left bank of this river with my whole party on my return from the northern interior, having explored the course of the river referred to in my letter of 23d December last, and others within the 29th parallel of latitude.

'There was so much fallen timber in the Nammoy, and its waters were so low, that the portable boats could not be used on that river with advantage, and I proceeded by land in a north-west direction, until convinced by its course turning more to the westward that this river joined the river Darling. I then quitted its banks with the intention of exploring the country further northward, by moving round the western extremities of the mountains mentioned in my former letter, and which I have since distinguished in my map by the name of the Lindesay Range. These mountains terminate abruptly on the west, and I entered a fine open country at their base, whence plains, or rather open ground of gentle undulation, extended westward as far as could be seen. On turning these mountains I directed my course northward, and to the eastward of north, into the country beyond them, in search of the river Kindur, and reached a river flowing westward, the bed of which was deep, broad, and permanent, but in which there was not then much water.

'The marks of inundation on trees, and on the adjoining high ground, proved that its floods rose to an extraordinary height; and from the latitude, and also from the general direction of its course, I considered this to be the river which Mr. Cunningham named the Gwydir, on crossing it sixty miles higher, in his route to Moreton Bay. I descended this river, and explored the country on its left bank for about eighty miles to the westward, when I found that its general course was somewhat to the southward of west. This river received no addition from the mountains over that part of its left bank traversed by me; and the heat being intense, the stream was at length so reduced, that I could step across it. The banks had become low, and the bed much contracted, being no longer gravelly but muddy. I therefore crossed this river, and travelled northward, on a meridian line, until, in the latitude of 29° 2′, I came upon the largest river I had yet seen. The banks were earthy and broken, the soil being loose, and the water of a white muddy colour. Trees, washed out by the roots from the soft soil, filled the bed of the river in many places. There was abundance of cod fish, of a small size, as well as of two other kinds of fish which we had caught in the Peel, the Nammoy, and the Gwydir. The name of the river, as well as we could make it out from the natives, was Karaula.—Having made fast one tree to the top of another tall tree, I obtained a view of the horizon, which appeared perfectly level, and I was in hopes that we had at length found a river which would flow to the northward and avoid the Darling. I accordingly ordered the boat to be put together, and sent Mr. White with a party some miles down to clear away any trees in the way. Mr. White came upon a rocky fall, and found besides the channel so much obstructed by trees, and the course so tortuous, that I determined to ascertain before embarking upon it, whether the general course was in the desired direction. Leaving Mr. White with half the party, I accordingly traced the Karaula downwards, and found that its course changed to south, a few miles below where I had made it, and that it was joined by the Gwydir only eight miles below where I had crossed that river. Immediately below the junction at the Gwydir (which is in latitude 29° 30′ 27″, longitude 148° 13′ 20″) the course of the river continues southward of west, directly towards where Captain Sturt discovered the river Darling; and I could no longer doubt that this was the same river. I therefore returned to the party, determined to explore the country farther northward.

'The results of my progress thus far were sufficient, I considered, to prove that the division of the waters falling towards the northern and southern shores of Australia is not, as has been supposed, in the direction of the Liverpool and Warrabungle range, but extends between Cape Byron on the eastern shore, towards

Dirk Hartog's Island on the west; the greater elongation of this country being between these points, and intermediate between the lines of its northern and southern coasts. The basin of the streams I have been upon must be bounded on the north by this dividing ground or watershed; and although no rise was perceptible in the northern horizon, the river was traversed by several rocky dykes over which it fell southward, their direction being oblique to the course, and nearly parallel to this division of the waters. I beg leave to state, that I should not feel certain on this point without having seen more, were it not also evident from Mr. Cunningham's observations, made on crossing this division on his way to Moreton Bay. Mr Cunningham, on crossing the head of this river, nearly in the same latitude, but much nearer its sources, found the height of its bed above the sea to be 840 feet: at about forty-five miles further northward the ground rose to upwards of 1700 feet, but immediately beyond, it reached a river flowing north-west, the height of which was only 1400 feet above the sea. He had thus crossed this dividing higher ground, between the parallels of 29° and 28°. It appears, therefore, that all the interior rivers we know of to the northward of the Murrimbidgee, belong to the basin of the Karaula—this stream flowing southward; and hence the disappearance of the Macquarie and other lower rivers may be understood, for all along the banks of the Karaula, the Gwydir, and the Nammoy, the country, though not swampy, bears marks of frequent inundation: thus the floods occasioned by these rivers united, cover the low country, and receive the Macquarie, so that no channel marks its further course.

'That a basin may be found to the northward receiving the waters of the northern part of the coast-range, in a similar manner, is extremely probable, and that they form a better river, because the angle is more acute between the high ground, which must bound it on the north-east and the watershed on the south. I therefore prepared to cross the Karaula, in hopes of seeing the head, at least, of such a river, and to explore the country two degrees farther northward, but moving in a north-west direction. My tent was struck, and I had just launched my portable boat for the purpose of crossing the river, when Mr. Surveyor Finch, whom I had instructed to bring up a supply of flour, arrived with the distressing intelligence, that two of his men had been killed by the natives, who had taken the flour, and were in possession of every thing he had brought—all the cattle, including his horse, being also dispersed or lost. I therefore determined not to extend my excursion farther, as the party were already on reduced rations; and on the 8th instant I retired from the Karaula, returning by the marked line, which being cut through thick scrubs in various places, is now

open, forming a tolerably direct line of communication in a north-west direction from Sydney, to a river, beyond which the survey may be extended whenever his Excellency the Governor thinks fit.

'The natives had never troubled my party on our advance; indeed, I only saw them when I came upon them by surprise, and then they always ran off. Their first visit was received at my camp on the Karaula, during my absence down that river, when they were very friendly, but much disposed to steal. Various tribes followed us on coming back, but never with any show of hostility, although moving in tribes of a hundred or more parallel to our marked line, or in our rear, it was necessary to be ever on our guard, and to encamp in strong positions only, arranging the drays for defence during the night: three men were always under arms, and I have much pleasure in stating, that throughout the whole excursion, and under circumstances of hardship and privation, the conduct of the men was very good. I took an armed party to the scene of pillage, and buried the bodies of the two men, who appeared to have been treacherously murdered while asleep by the blacks during the absence of Mr. Finch: no natives were to be found when I visited the spot, although it appeared, from columns of smoke on hills which overlooked it, that they were watching our movements.

'The party has now arrived within a day's journey of Brown's station, and I have instructed Assistant Surveyor White (from whom I have received great assistance during the whole journey) to conduct it homewards being desirous of proceeding, without delay, to Sydney, to receive the instructions of his Excellency the Governor. 'I have the honour to be, &c.

'T. L. Mitchell, Surveyor-General.

'To the Hon. the Colonial Secretary, &c. &c.'

On which letters Mr. Cunningham also tenders the following remarks:—

This expedition took its departure from Segenhoe (the estate of Mr. Potter Macqueen, situate on a branch of Hunter's River) and passed the Dividing Range at the head of Dartbrook; thence advancing along the eastern skirts of Liverpool Plains to a cattle station, called by the natives Walamoul, situate on the left bank of *Field's* River* of Mr. Oxley, about a mile and a half

* 'From the character of the river on the banks of which Major Mitchell dates his first despatch, as well as the direction of its course, and the geographical position of his encampment, it is quite evident that he was on the Field and not, as he supposed, on the Peel of Mr. Oxley, which latter lies altogether to the eastward, about twenty-eight miles from Walamoul, separated from Liverpool Plains by a range of rocky hills, which effectually prevents any of the streams that drain those extensive levels from falling into its channel. Its course is moreover to the north

above the spot where that able traveller forded it on the 1st of September, 1818, whilst on his route easterly with his party towards Port Macquarie. The situation, therefore, of Walamoul (the out-station of a Mr. Brown) in the wooded country on the north-eastern side of Liverpool Plains, is in latitude 31° 7′ 30″ S., and longitude 150° 12′ 30″ E.

'Finding it impracticable to pursue a course to the north from that station, in consequence of the high lands connected with Hardwicke's Range, Major Mitchell determined to make an offing to the westward in the first instance, and, accordingly, he proceeded to trace Field's river (the Nammoy of the natives) downwards on its left bank, the general course of which proved to be in that direction.

'In their route the party traversed extensive patches of plain, having native names, which were ascertained, and which appear to be the heads of the great valleys of Camden and Barrow of the late Surveyor-General; the former, the north-western branch of Liverpool Plains, through which the Yorke of Mr. Oxley, or the Connadelly of the natives, winds towards its junction with the Field. At length, having followed this river to a level open country beyond the hills, the expedition rested on its right bank at a spot locally named Bullabalakit, whence the Surveyor-General addressed his first letter to the local government, reporting the progress of his expedition, and his intention to employ the portable boats with which he had been provided, in descending the stream, from the place where his tents were pitched, and which he ascertained, by observation, to be in latitude 30° 38′ south, and longitude 149° 30′ east, or about six miles to the north of those Morasses which prevented the late Mr. Oxley (who little apprehended that he was in the vicinity of a river) from advancing to the north-east in August, 1818.

'The Field, which had, in that year of great rains, overflowed its banks and inundated the adjacent grounds, was, however, now found to be so low, with its channel so much obstructed by drift timber, that Major Mitchell could not advantageously employ his boats; and as he immediately afterwards discovered that the direction of its course was continued to the westward, and that it must ultimately fall either into the Castlereagh or Darling (probably the former) he gave up its further examination, and at once directed the march of his expedition towards the north. On this course the

(at least as far as the parallel of 30°) and not westerly, as Major Mitchell found that of the river on which himself and party were, which receives, as he observes, the waters of the plains. This is therefore the Field of the late Surveyor-General, on the left bank of which, about fifteen miles below Walamoul, I rested my party in July 1827; the spot on which my tents then stood being about forty-four English miles to the E.S.E. of Major Mitchell's encampment on the same stream in December last.

party traversed an extent of level open country, in search of the river Kindur, reported to have been seen by the runaway convict; and, after a journey of several days, they reached its left bank, where its channel, though broad and deep, contained, nevertheless, but little water, such having been the effects of solar evaporation; the heat of the atmosphere being also, at the time, intense. And the intersection, by the expedition, of this river, in about 29° 15′ south, and longitude 149° 25′ east, satisfied Major Mitchell that it was indeed identical with my Gwydir, which I had forded in 1827, about sixty miles higher, or to the south-east, whilst on my return from Moreton Bay.

'The Gwydir, or Kindur, then, was now followed on its left bank, upwards of eighty miles to the westward, in which space not a single tributary fell into it; and as its channel at that distance became (as Captain Sturt had found the Morrumbidgee near its junction with the Murray) much contracted, and its banks very low, Major Mitchell left it also, as he had done the Nammoy, and directing the steps of his party northerly (under the meridian of about 148° 20′ east), he gained, in about thirty miles, the bank of a third river, called by the aborigines, as far as they could be understood by our travellers, Karaula, which being of greater magnitude than either of the other streams explored, and flowing through a perfectly level country, led the party to entertain the hope that they had really at length found a river, which would pursue a steady course in the "desired direction;" viz. towards the north-west. Its banks, moreover, which were inhabited by natives of a friendly disposition, were earthy and broken, and its waters, although turbid, were discovered to contain three species of fish.

'A subsequent examination, however, ascertained that the navigation of its channel was also interrupted by fallen timber, and other obstructions; and the expectation of its long course to the north-west was soon given up, when it was seen to take a decided bend to the south, and, in a few miles, unite itself to the Gwydir, or Kindur, at a point of its course to the west, shown, by the observations taken, to be only sixty-three statute miles E.N.E. from the junction of the Castlereagh and Darling, as ascertained by Captain Sturt, thereby proving that the confluence of the Karaula * and Kindur form the latter river.

* 'I would here notice that the Karaula is the same river that I passed in the parallel of 29°, whilst on my outward-bound route to Moreton Bay in 1827, and then named "Dumaresq," the gravelly bed of which, exceeding eighty yards in breadth, and at that period in part dried up by an eighteen months' drought, I found by the barometer to be only 840 feet above the level of the sea. It rises, however, at an elevation of about 3000 feet, in the great dividing range which, between the parallels of 27° and 29°, extends under the meridian of 152°; and as Major Mitchell fell in with its channel in a level interior (certainly not 800 feet above the sea-coast) in latitude 29° 2′, and about 140 miles distant from the spot at which my party had crossed it, its course between our two points of intersection of its channel is shown to be almost directly west.

'Having thus seen the junction of these streams, it was the design of Major Mitchell to have continued his journey northerly from the Karaula or Dumaresq, with the view of verifying a theory, which it appears he entertains, of the existence of a chain of high grounds in 28° south, which, as he supposes, stretches from the dividing range, westerly, towards Dirk Hartog's Island, off Shark's Bay, on the shores of Western Australia, and thus separates the several waters, now known to form the Darling, from streams, which having a more northern origin in the great coast-range, pursue a course, through the inter-tropical portions of the interior, westerly and northerly.* However, the distressing circumstances, to which he refers in his despatch to the local government, prevented his crossing the parallel of 29°, and making the discoveries he had promised himself; for on the 8th of February we find him quit the banks of the Dumaresq, or Karaula, and retracing his steps, in three weeks again make the Field, or Nammoy, within a day's journey of the cattle station at Walamoul.

'The hypothesis of a "dividing-ground or water-shed," extending in the parallel of 28°, westerly, from the great Coast-chain, appears, however, somewhat gratuitous; for Major Mitchell himself admits, that from the extreme point to which he was enabled to penetrate into the interior, viz. his encampment on the Karaula in 29° 2′, no rise was perceptible on the northern horizon. And the following brief remarks on the features of the country traversed by my party in 1827, between latitudes 28° and 29°, (and which are given at greater length in my preceding paper in this volume,) will further show how far it derives support, as Major Mitchell conceives that it evidently does, from the results of the barometrical observations which I then made.

'Throughout that journey I found the interior suffering greatly from the effects of a long and generally prevalent drought. I nevertheless was enabled to pursue nearly a direct course to the north, between the meridians of 150° and 151°, through a country of moderate undulations, the mean elevation of which (above the level of the sea) proved to be about 1100 feet. On reaching the parallel of 29°, however, we found that we had descended nearly 300 feet, to a barren level tract of country extending far and wide around us, through which we discovered the Karaula, or Dumaresq, passing to the westward; and excepting on its immediate banks, where we met with a scanty vegetation, the whole might be

[* Major Mitchell bases this theory on the circumstance of the curvature of the eastern coast-line in the parallels of 27° and 28°, from which he infers, that the great dividing chain, which sweeps in a curve parallel to it, and therefore is 'concave towards the interior, *must form* a very extensive basin, which *should* concentrate its waters about the latitude of 28° south.' He explains this at length in a letter addressed to Mr. Hay,—also communicated by him to the Royal Geographical Society,—and cites the origin and course of the Amazon as constituting a similar case elsewhere.]

said to be a perfect waste, entirely destitute of grass or esculent herbage. To relieve, therefore, the half-famished horses of my expedition, I was necessitated to pursue a more eastern course than I would, under other circumstances, have done; which led us among the hills, where we fortunately did meet, not only with some little pasturage, but a sufficiency of water to meet our daily wants. And in this new line of route to the eastward, which employed us a week of severe exercise before we gained the great downs in the parallel of 28°, we gradually rose in elevation from 811 to 1100, 1544, and even 1717 feet above the sea-shore, ere we reached the left bank of Condamine's Rivulet, to which we, however, again descended upwards of 300 feet, its elevation above the shore of Moreton Bay being 1402 feet.

'But these hills, notwithstanding their progressive rise to a height of 900 feet above the bed of the Karaula, constitute, nevertheless, no dividing ridge (giving opposite directions to the course of the waters, that flow interiorly from the main range), but are merely a succession of lateral ridges, which extend westerly from the main or leading coast-chain of mountains, and, doubtless, either terminate abruptly in bluff points or heads, overlooking the lower interior, or gradually decline in elevation as they advance westerly, until they disappear on the general level. And that this is the real structure of the interior in and about the parallel of 28°, I am fully induced to believe, from what I beheld of the country to the northward of my station in the latitude of 29°, before I had directed my course among the hills to the eastward, in order to avoid, what was obviously between the points of north by east and north-west, a level arid waste.

'Another expedition, despatched to explore the country northerly, beyond the banks of the Karaula, or Dumaresq, in 29°, where Major Mitchell's excursion terminated, will most probably discover to the westward of the meridian of 150°, an interior, extending through several degrees of latitude, of level unbroken surface; and it will, moreover, be found, that Condamine's Rivulet (the stream to which the indefatigable commander of the late expedition refers in his second despatch, as being 1400 feet above the level of the sea), so far from being separated from the Karaula, by a "dividing-ground" extending westerly, ultimately falls into it, and thus forms a small auxiliary to the Darling of Captain Sturt, of which, most probably, indeed, it is not even the most northern branch.

'Although the result of the late expedition has not been the discovery of any new river, still its conductor has intersected and traced those already known, farther to the westward than had been previously seen, and has thus shown their tendency towards the channel of the Darling. The story of the convict runaway, he has

also proved to be, for the most part, a mere fabrication; but the question, of what becomes of the Darling, beyond the spot where Captain Sturt left it, pointing to the south-west, remains still unanswered. A. C.'

Despatches have been also received, within the last few days, from Lieut.-Governor Stirling, Western Australia; the following extract from which, with the accompanying map, has been further communicated to the Royal Geographical Society, by direction of Viscount Goderich, President.

'*Swan River, 2d April,* 1832.—The only portion of Western Australia which has been any way examined or explored is inclosed in the accompanying map of reference, which will afford, at a view, a general idea of the routes and discoveries of the principal exploring parties. It will not be requisite for me to enter into the details of the reports which have been made to me on these matters; but I shall endeavour to give a general sketch of the information which we possess relative to the soils, the surface, the supply of water, the climate, and the indigenous products of the country.

'The coast from Gantheaume Bay on the west to Doubtful Island Bay on the south, including the several islets and rocks, present the remarkable calcareous substance which has been supposed to exist in no other place than on the shores of New Holland and on those of Sicily. Although it serves in general as a kind of edging to this part of the continent, it is occasionally interrupted by the protrusion of granite and trap; and it is in some places covered by sand. The open downs which it forms sometimes afford good sheep-keep, and it burns into very fine lime; but in general the soil upon it is of little value. Behind this sea range of hills, which are sometimes 800 feet in height, and two or three miles in breadth, there is a low sandy district which appears to have had a diluvial origin, as it exhibits occasionally pebbles and detached pieces of the older rocks, and varies from mere sand to red loam and clay. In some parts this sandy district presents considerable portions of very fine soil, and in no part is it absolutely sterile. The banks of the rivers, which flow through it, are of the richest description of soil, and although a large portion would not pay for cultivation at the present price of labour, it is not unfit for grazing. Out of this sandy plain there occasionally arise ranges and detached hills of primitive formation, the most extensive of which is the range which bounds the plain on the east or landward side, and extends from the south coast between Cape D'Entracasteux and Wilson's Inlet,

northward to the 30th degree of latitude. The highest altitude attained by these primitive mountains is about 3,500 feet, which is supposed to be the height of Roi Kyncriff, behind King George's Sound; but the average height may be stated at 1000 feet. To the eastward of the principal of these ranges is an interior country of a different formation from that on the coast, being of a red loamy character. It appears to have the lowest portion of its surface about 500 feet above the level of the sea, and discharges all its waters westwardly, or southwardly, through the range aforesaid. Some of these streams have a constant current, and would afford a supply of water in the dryest months; and, in general, neither the interior nor the country near the coast can be said to be badly watered.

'Such is the imperfect sketch which I am able to afford of the general surface of the country. In the quality of its soils it is extremely variable; but there have been ascertained to exist, by Captain Bannister, Mr. Dale, and many other explorers, extensive districts of land of the best kind. And having given that point every attention, being fully aware of the great importance of being well assured that there is a sufficiency of fertile land, I may now express my conviction, from the reports of others no less than by my own observations, that there is abundance, and indeed as large a proportion of it as usually exists in such extensive territories.

'The only products of the country of any value at present are its timber, which is inexhaustible and of excellent quality, and its grasses, which afford feed of superior quality for sheep, horses, and cattle. There is a good species of tobacco and perennial flax, similar to the kind usually cultivated in Europe; but these are as yet only valuable as indicative of the capabilities of the soil.

'For some time back registers of the weather have been kept at King George's Sound and at Perth; and hereafter it will be possible to ascertain with precision the ranges of the temperature, the barometrical pressure, and the degree of moisture in these districts, compared with other countries. At present, after three years' experience of the climate of the Swan River district, it may be said to be exceptionable only in the months of January, February, and March, when the heat and drought are as disagreeable as they can be without affecting health. The district of King George's Sound being exposed to southerly winds in summer, and frequently visited by showers, is the most equable, perhaps, in the world, and the most temperate. The heat on the west coast is certainly intense, and the mosquitos, which abound there in summer, are serious evils in their way, and have caused some dislike to this part of the country as a place of residence. But notwithstanding these and other local and trivial objections, the climate, the ports, the position, and extent of the country, are

such as fit it to be the seat of a wealthy and populous possession of the crown; and I feel justified in saying, in this stage of its occupation, that it will not fail to become such, from any natural disqualification of the soil.'

X.—*Expedition to ascertain the Fate of Captain Ross.* From Materials communicated to the Royal Geographical Society.

Two expeditions have been planned, during the present season, in this country, in which the pursuit of geographical science is combined, to great advantage, with other more stirring incentives to action; and for which, accordingly, the requisite funds will be furnished, in whole or in part, by private zeal. One is a trading expedition up the Quorra, consisting of two steam-vessels and a brig, well armed, and most liberally equipped, which sailed last July, under the command of Mr. M'Gregor Laird, one of the enterprising Liverpool merchants who have engaged in this magnificent commercial speculation; having also on board Mr. Richard Lander, as interpreter and guide, and Lieutenant Allen, R.N., as surveyor, appointed to this service by the Admiralty, and furnished with every requisite instrument for making an exact survey of the river, so far as his opportunities may permit. The other is a land expedition destined to penetrate across the territories of the Hudson's Bay Company to the shores of the Arctic Sea, primarily to ascertain the fate of Captain Ross, who, it is well known, has not been heard of since he sailed in a steam-boat three years ago, with the view of thus effecting a north-west passage to the Pacific; and, subordinate to this object, to extend our knowledge of those shores—in particular, to endeavour to fill up the interval between Cape Turnagain (the eastern limit of Sir John Franklin's discoveries) and the Straits of the Fury and Hecla, where Sir Edward Parry was stopped by the ice when attempting to penetrate to the westward along the coast; or, should these prove, as some imagine, merely the entrance of an inlet, to determine where else is situated the north-eastern extremity of the American continent.

The hopes entertained by Captain Ross's friends that he and his companions are still alive, and may be extricated from their critical position by efforts yet made for their relief, are founded, partly on the extent of his preparations, which were calculated to meet his wants for three years,—partly on the amount of stores which, it is presumed, he would find untouched in the wreck of the Fury, abandoned by Sir Edward Parry in 1825,—and partly on the following account (given by Hearne, and quoted by Mr. Barrow in his Chronological History of Arctic Voyages, pp. 276-8.)

of the fate of the crews of two Hudson Bay vessels who were cast on shore on Marble Island in 1719, and of whom it was ascertained, afterwards, that some survived nearly three years.

'In the summer of 1769, (says Mr. Hearne, Introd. p. xxxi.) 'while we were prosecuting the fishery, we saw several Esquimaux at this new harbour, and perceiving one or two of them greatly advanced in years, our curiosity was excited to ask them some questions concerning the above ship and sloop, which we were the better enabled to do by the assistance of an Esquimaux, who was then in the Company's service as a linguist, and annually sailed in one of their vessels in that character. The account which we received from them was full, clear, and unreserved, and the sum of it was to the following purport:—

'When the vessels arrived at this place (Marble Island) it was very late in the fall, and, in getting them into the harbour, the largest received much damage; but on being fairly in, the English began to build the house, their number at that time seeming to be about fifty. As soon as the ice permitted in the following summer, 1720, the Esquimaux paid them another visit, by which time the number of the English was very greatly reduced, and those that were living seemed very unhealthy. According to the account given by the Esquimaux, they were then very busily employed, but about what they could not easily decribe; probably in lengthening the long-boat, for, at a little distance from the house, there was now lying a great quantity of oak chips, which had been made most assuredly by carpenters.

'A sickness and famine occasioned such havock among the English that by the setting in of the second winter their number was reduced to twenty. That winter, 1720, some of the Esquimaux took up their abode on the opposite side of the harbour to that on which the English had built their houses, and frequently supplied them with such provisions as they had, which chiefly consisted of whale's blubber, seal's flesh, and train oil. When the spring advanced, the Esquimaux went to the continent, and on their visiting Marble Island again, in the summer of 1721, they only found five of the English alive; and these were in such distress for provisions, that they eagerly ate the seal's flesh and whale's blubber quite raw as they purchased it from the natives. This disordered them so much that three of them died in a few days, and the other two, though very weak, made a shift to bury them. These two survived many days after the rest, and frequently went to the top of an adjacent rock and earnestly looked to the south and east, as if in expectation of some vessels coming to their relief. After continuing there a considerable time, and nothing appearing in sight, they sat down close together and wept bitterly. At length one of the two died, and

the other's strength was so far exhausted, that he fell down and died also in attempting to dig a grave for his companion. The sculls and other large bones of these two men are now lying above-ground close to the house. The longest liver was, according to the Esquimaux account, always employed in working iron into implements for them ; probably he was the armourer or smith.'

If then (it is argued), severe as the sufferings of these poor people were, they could prolong their existence at all, for nearly three years on Marble Island, which is a bare granite rock, with scarcely any local resources whatever, is it not probable that Captain Ross's difficulties, even supposing that he was wrecked the first year of his departure, may not yet have been overwhelming ? If they could thus survive, also, with only a moderate stock of supplies in their ships, fitted out, as these necessarily were, after the manner of the last century, may not his party be still furnished amply in comparison ? And even the character of the country seems to require that some search should be made for them—that nineteen British seamen, embarked in the most disinterestedly spirited enterprise of the day, should not be lightly given up to their fate ;—especially when, by the same means, the discoveries of Franklin and Parry may be connected, and a series of expeditions be, as it were, completed, which, in so far as they have gone, reflect the highest credit on British skill and enterprise, and have left, in truth, little more than the blank here contemplated to be filled up, in order to complete our knowledge of the outline of the American coast.

These views have been, therefore, lately brought under the consideration of his Majesty's Government, and sanguine hopes are entertained that it may be induced to subscribe 2000*l.* towards carrying them into effect. The Hudson's Bay Company has, also, with great liberality, consented to provide boats and provisions for the party gratuitously; and has already forwarded the requisite orders for this purpose. Captain Back, R.N., one of Sir John Franklin's companions in both his journeys, has volunteered to conduct the expedition, the plan of which was originally sketched by Dr. Richardson, and has been since carefully revised and re-considered by both these able officers. The party will be forwarded early in February next to New York ; whence it will proceed, by way of Montreal, to Great Slave Lake ; and descend the Fish River as early in the season as possible, probably in August. But two seasons, at least, will be requisite to execute the service in any degree satisfactorily ; and, in every case, the scale of operations, their extent, continuance, and ultimate success, will mainly depend on the means obtained for their execution.

Subscriptions towards the ARCTIC LAND EXPEDITION are

accordingly now in course of being received by some principal bankers in London, Edinburgh, and Dublin; and the amount, whatever it may be, will be placed under the control, and administered under the sole authority of a Committee of noblemen and gentlemen, of whom a most respectable list is already in circulation as having, with Admiral the Right Hon. Sir George Cockburn, G.C.B., as their chairman, signified their willingness to accept the trust. Men of all descriptions must wish well to the undertaking, for science must gain by it, though humanity is its leading motive; and trained, as Captain Back has been, in the school of Franklin, the difficulties, which that gallant officer's experience enabled him to overcome with so much more facility in his second journey than in his first, will probably be found still more easily surmountable in a third attempt.

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